

PERRY LAKE
2000 Water Quality Report

1. General.

a. **Project location.** Perry Dam is located at river mile 5.3 on the Delaware River, 3 miles northwest of Perry, Kansas. The project watershed encompasses 1,117 square miles.

b. **Authorized project purposes.** Flood control and water supply are the primary project purposes; equally important, however, are its fish and wildlife resources and recreation benefits.

c. **Pertinent data.**

| Pools | Surface Elevation (ft. above m.s.l.) | Current Capacity (1,000 A.F.) | Surface Area (Acres) | Shoreline (miles) |
|---------------|---|----------------------------------|-------------------------|----------------------|
| Flood Control | 920.6 | 509.3 | 25,347 | |
| Multipurpose | 891.5 | 206.7* | 11,146 | 160 |
| Inactive | | 90.7** | | |
| Total | | 716.0 | | |

Total Drainage Area: 1,117 sq. miles
Average Annual Inflow: 585,391 acre-feet

* Estimate based on most recent hydrographic survey.

** Contained in multipurpose pool.

2. Activities and studies of the year.

Monthly herbicide and nutrient sampling was conducted by lake project personnel, with technical and analytical support from PM-PR-W, April-September 2000 at two inflow stations, three lake stations (two depths), and the outlet. Nutrient samples were shipped to the Chemical and Materials Quality Assurance Laboratory (CMQAL) in Omaha for analysis while the herbicide samples were shipped to the PM-PR-W laboratory for analysis of four of the most commonly occurring herbicides by the enzyme linked immunosorbent assay (ELISA) method. Ten percent of the herbicide samples were shipped to the CMQAL to be analyzed by Gas Chromatography (GC) for quality control purposes. All generated data were entered in Excel spreadsheets as an interim to the EPA national water quality data management system, NEW STORET, which is to become readily available to us later this year. Table 1 at the end of this report includes all the available nutrient and herbicide data for the years 1996-2000.

The OF-PE is to be commended for its continued support of water quality monitoring of Perry Lake and its tributaries. The OF-PE personnel deserving special recognition include Mrs. Bunnie Watkins, Mr. Robert Reed, and Mr. Francis Funk.

3. Existing conditions.

a. Inflow.

Six monthly samples were collected at both the Delaware River inflow station (PE-29) and the Rock Creek inflow station (PE-17) during April-September 2000. Total nitrogen (i.e., $\text{NH}_3 + \text{TKN} + \text{NO}_2 + \text{NO}_3$) mean concentrations ranged from eutrophic levels ($> 1 \text{ mg/L}$) of 1.62 mg/L in the Rock Creek stream to 0.75 mg/L in the Delaware River. Total nitrogen concentrations for the period of record have generally exceeded the EPA criterion for the protection of aquatic ecosystems from excessive eutrophication

FIGURE 1: PE-29

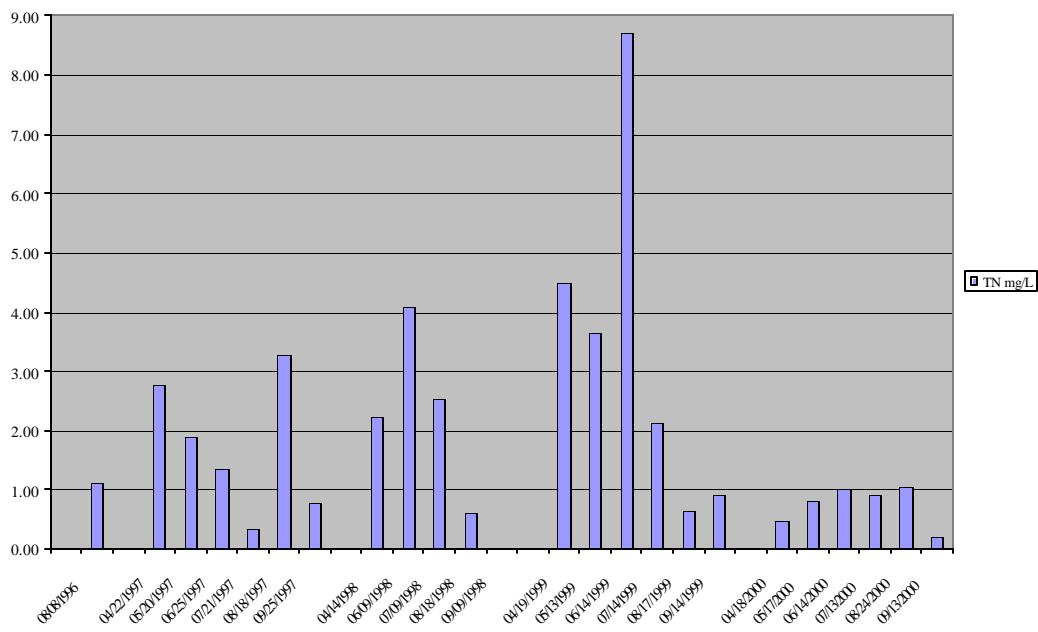
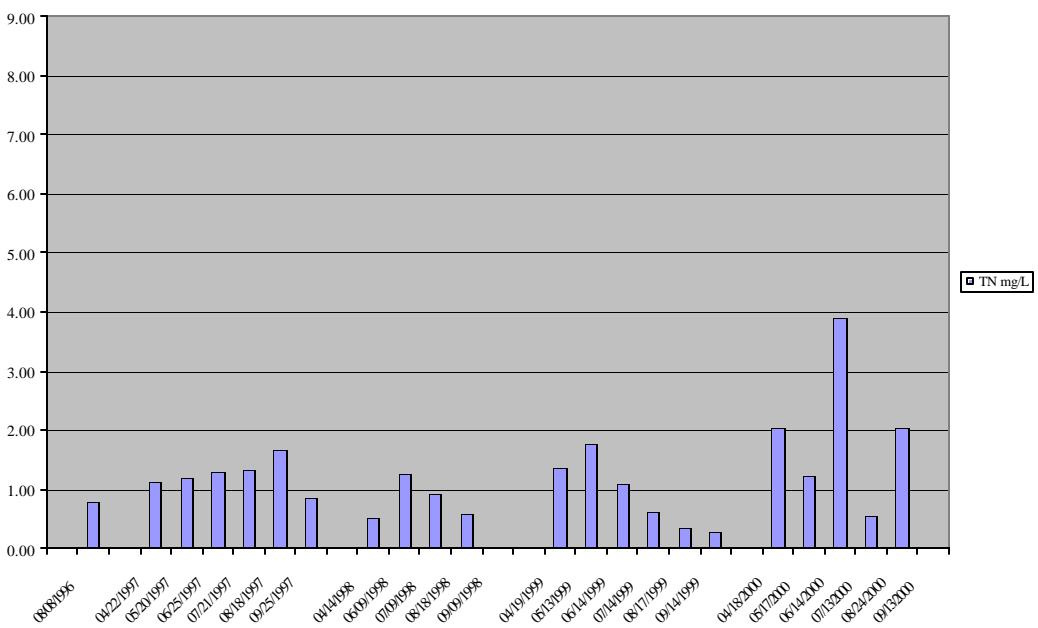


FIGURE 2: PE-17



(<1 mg/L) and have demonstrated the elevated, long-term, nutrient loading to both streams. Figures 1 and 2 show the trend for total nitrogen concentrations over the past four years. Spikes typically occur during high inflows such as April, May, and June

of 1999. Total phosphorus mean concentrations followed a similar pattern from eutrophic levels (> 0.1 mg/L) of 0.32 mg/L in the Rock Creek stream to 0.18 mg/L in the Delaware River. These, as well as other nutrient

parameters, indicate substantial nutrient loading in both the inflows to Perry Lake. Figures 3 and 4 show this trend for the past four years. The lower concentrations in the Delaware River are

apparently due to the near drought conditions experienced during the sampling and run-off

FIGURE 3: PE-29

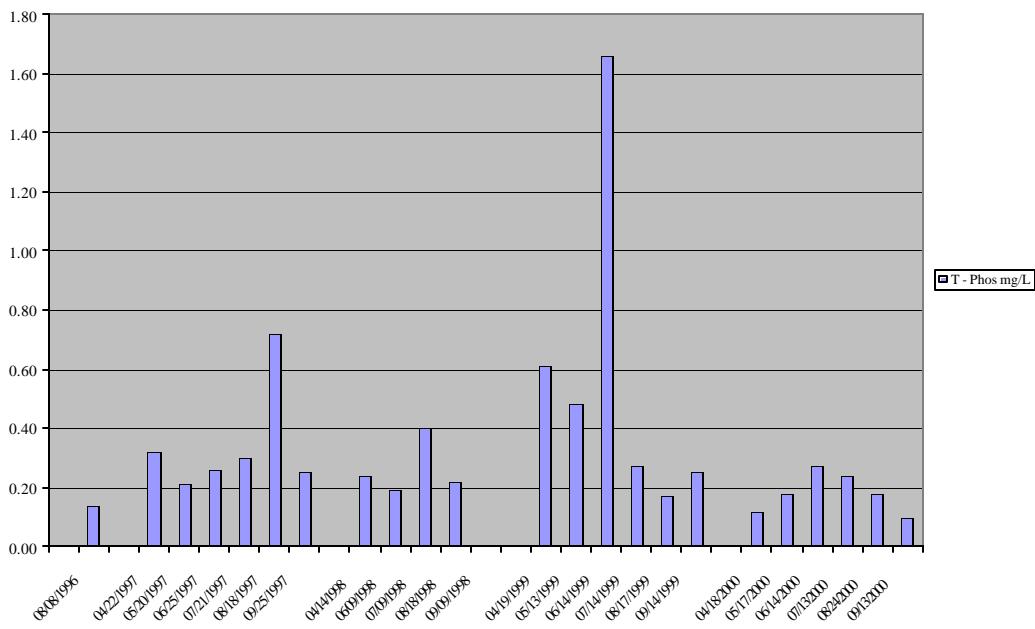
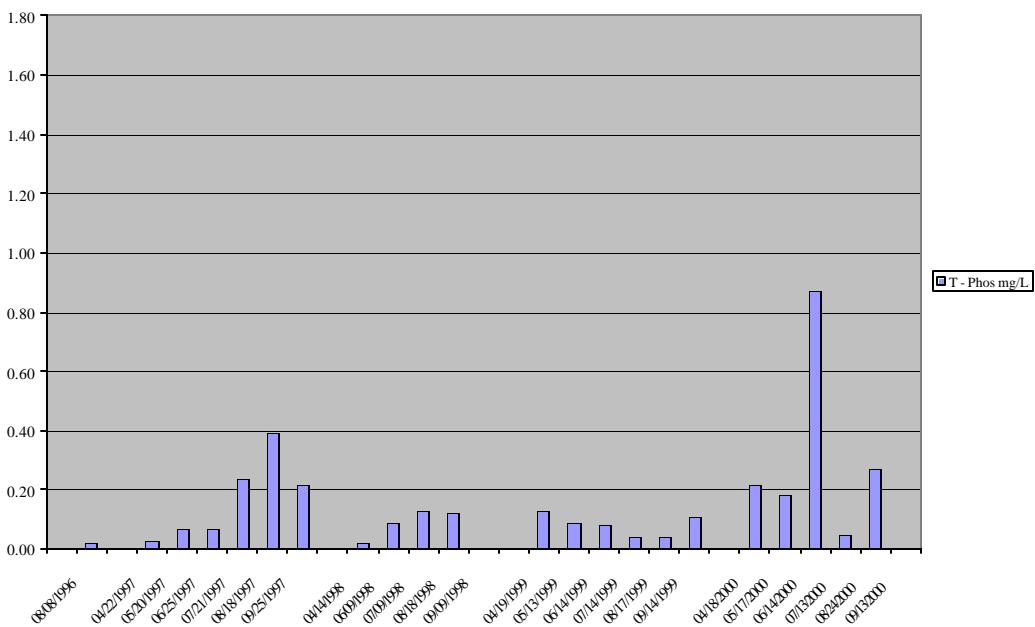


FIGURE 4: PE-17



seasons.

The four pesticides (atrazine, metolachlor, alachlor, and cyanazine) were detected during the six monthly sampling periods at both inflows. A test for acetochlor was also conducted in July but the herbicide was not detected.

Atrazine was detected in 100% of the PE-29 samples (mean and maximum concentrations of 1.12 ug/L and 2.54 ug/L, respectively) and in 67% of the PE-17 samples (mean and maximum concentrations of 1.52 ug/L and 2.76 ug/L, respectively). None of the samples from either inflow exceeded the EPA criterion of 3 ug/L for drinking water supplies. The concentrations of atrazine were much lower during the 2000 season due to the drought like conditions and resulting low flows.

Figures 5 and 6 show the typical pattern of high concentrations during high flow, high application periods with lower concentrations

FIGURE 5: PE-29

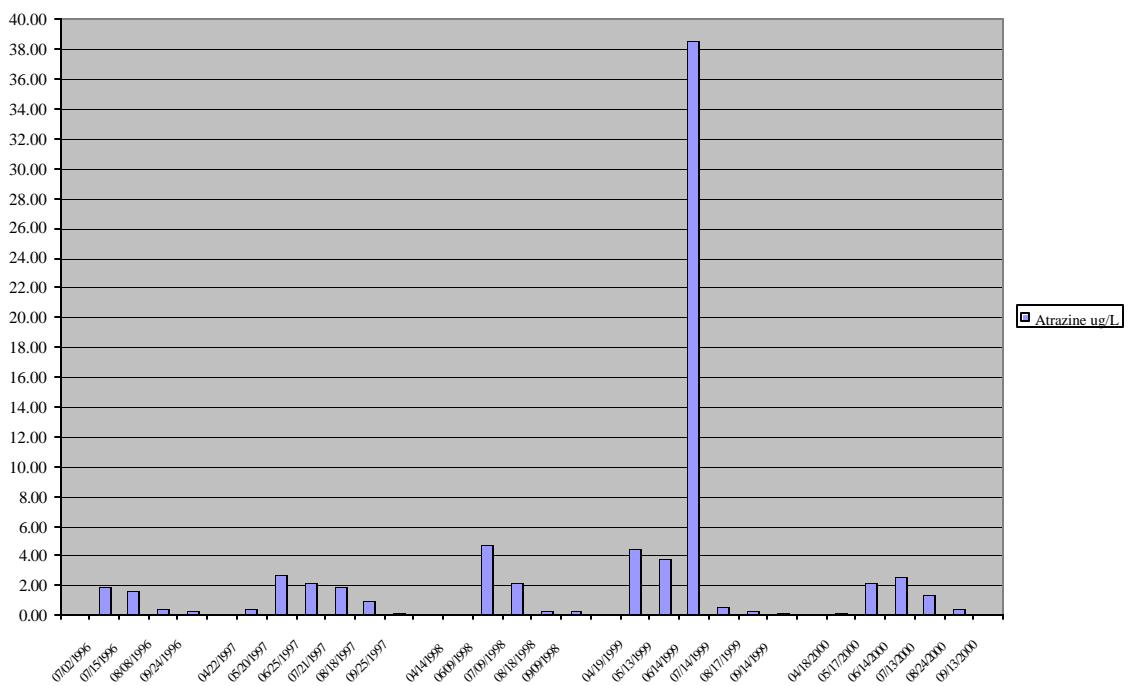
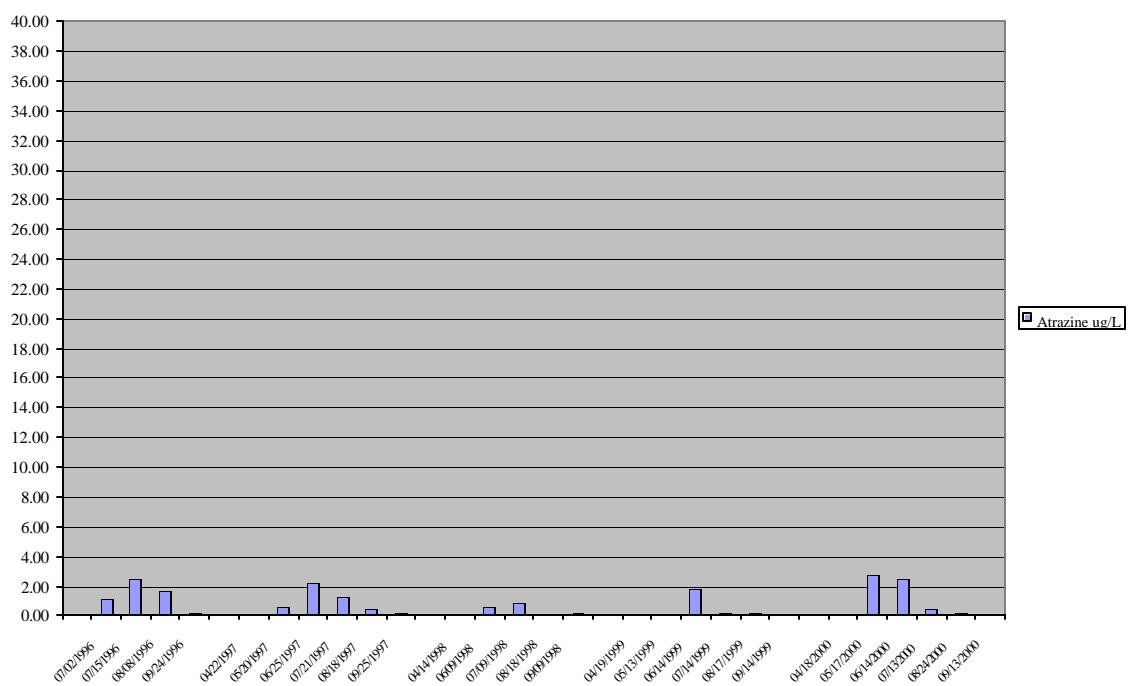


FIGURE 6: PE-17



during other months. Concentrations of alachlor averaged 0.21 ug/L and 4.88 ug/L, respectively, in the Delaware River and the Rock Creek stream. Two of the samples from the Rock Creek stream exceeded the EPA criterion of 2 ug/L. Cyanazine concentrations were low and did not exceed established criteria. No criterion has been established for metolachlor. Although, metolachlor was detected in both streams, concentrations were low.

b. Lake. The downlake area near the dam (PE-2), uplake in the Delaware arm (PE-6) and uplake in the Rock Creek arm (PE-13) were sampled during the six months from April through September 2000. As can be seen in figures 7, 8, and 9, nutrient concentrations were typical of the impoundment over the period of record. These three graphs show the relationship between surface and bottom concentrations for the past four years. Concentrations within the water column and throughout the lake appear to be fairly uniform. The high spikes can be

FIGURE 7: PE-2

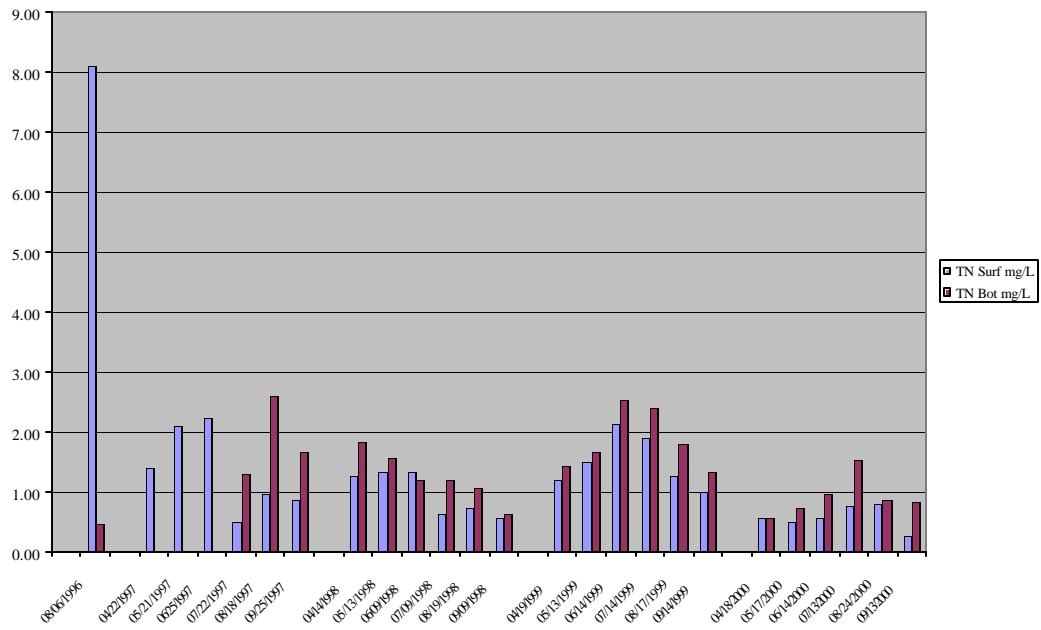
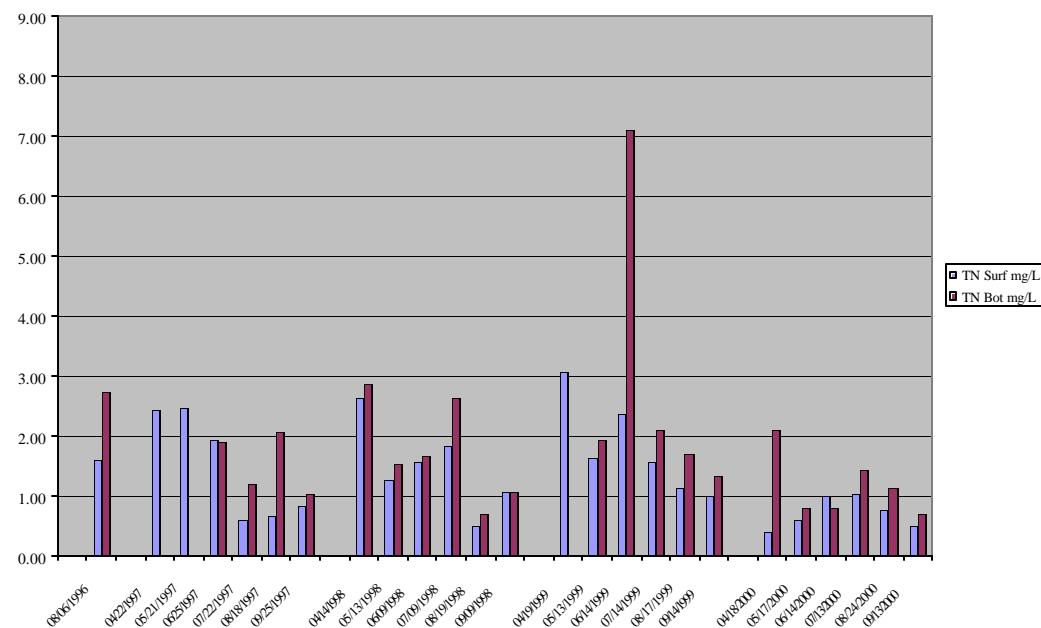


FIGURE 8: PE-6



attributed to high inflows and temperature difference between surface and bottom waters. Nutrient concentrations were close to or above eutrophic levels at all three locations. The 2000 mean and maximum concentrations in the surface waters were 0.59 mg/L and 0.81 mg/L, respectively, at PE-2; 0.72 mg/L and 1.05 mg/L, respectively, at PE-6; and 0.59 mg/L and 0.96 mg/L, respectively, at PE-13. These concentrations remained fairly constant throughout the lake.

Values in the bottom waters

were higher with mean and maximum concentrations of 0.93 mg/L and 1.54 mg/L, respectively, at PE-2; 1.17 mg/L and 2.10 mg/L,

respectively, at PE-6; and 1.12 mg/L and 2.42 mg/L,

respectively, at PE-13. Total phosphorus concentrations contributed to the eutrophic nature of the lake with

mean and maximum concentrations in the surface waters of 0.08 mg/L and 0.17 mg/L, respectively, at PE-2; 0.12 mg/L and 0.21 mg/L, respectively, at PE-6; and 0.07 mg/L and 0.12 mg/L,

FIGURE 9: PE-13

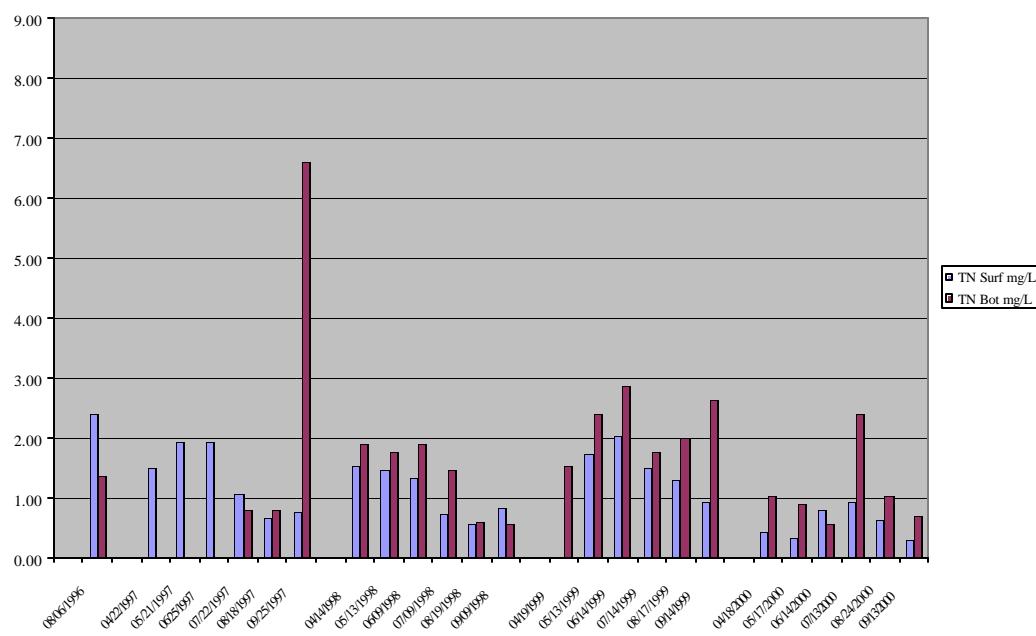
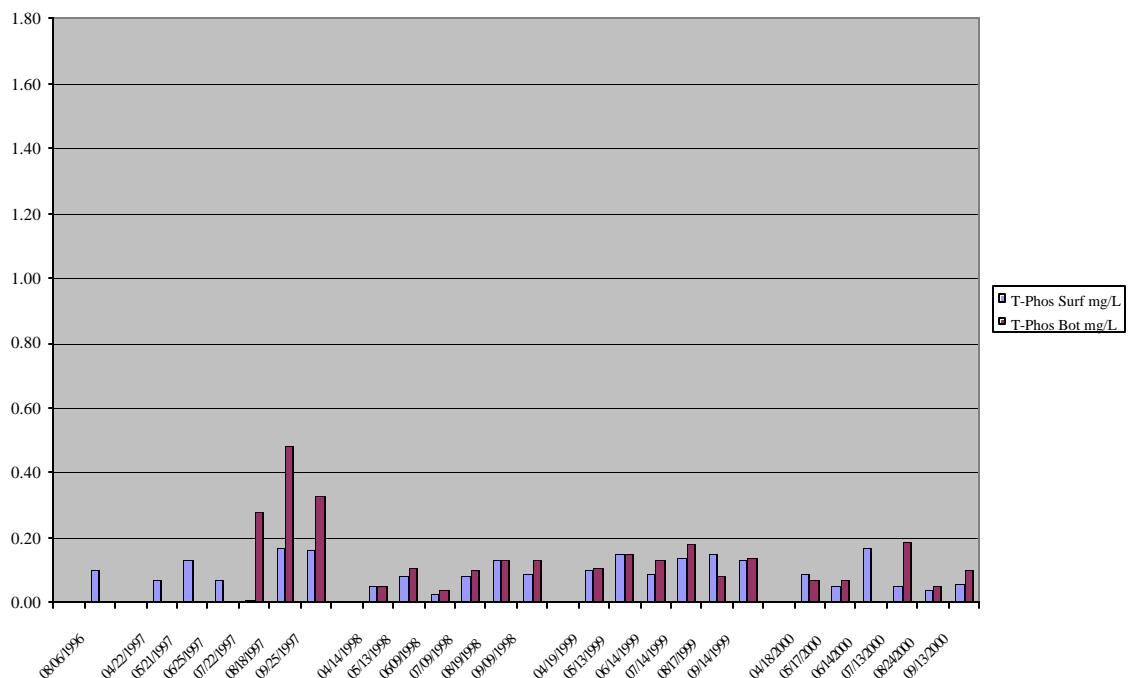


FIGURE 10: PE-2



respectively, at PE-13. Mean TP concentrations were also higher in the bottom waters (0.10 mg/L, 0.21 mg/L, and 0.12 mg/L, respectively). Figures 10, 11, and 12 show total phosphorus concentrations at the surface and bottom depths throughout the lake from 1996-2000. Total phosphorus concentrations tend to follow the same pattern as the total nitrogen concentrations, fairly uniform throughout the lake. Thus, the lake continues to be moderately to highly enriched with nutrients.

In the monthly surveys for herbicides, the above three lake sites were sampled. All four of the herbicides tested (atrazine, metolachlor, alachlor, and cyanazine) were detected both in surface and bottom waters. A test for acetochlor was also conducted in July but the herbicide was not detected. Atrazine was detected in 100% of the 2000 samples. None of the samples exceeded

FIGURE 11: PE-6

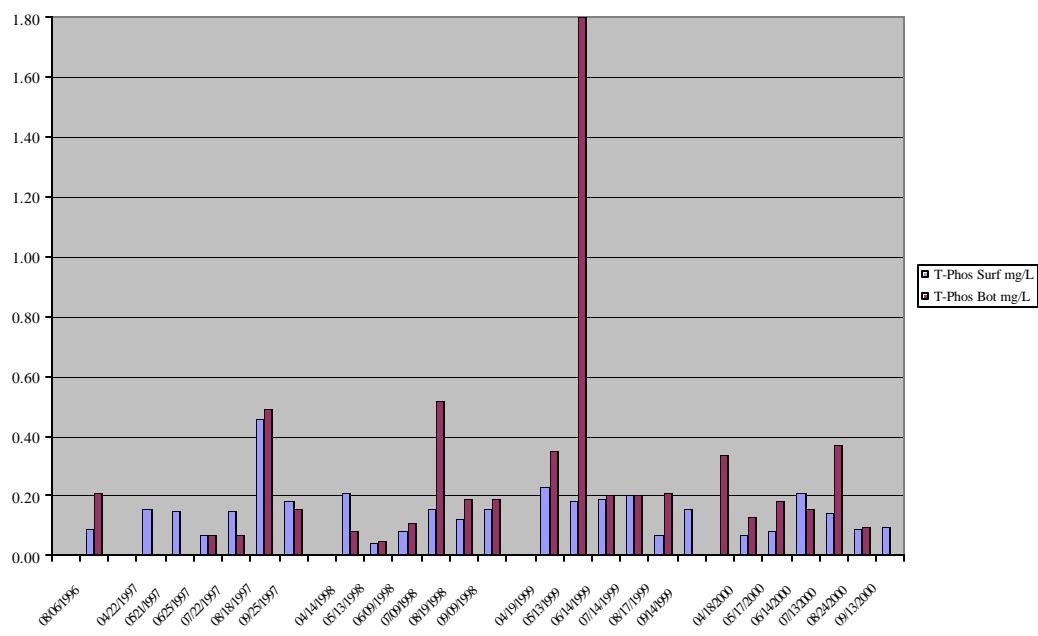
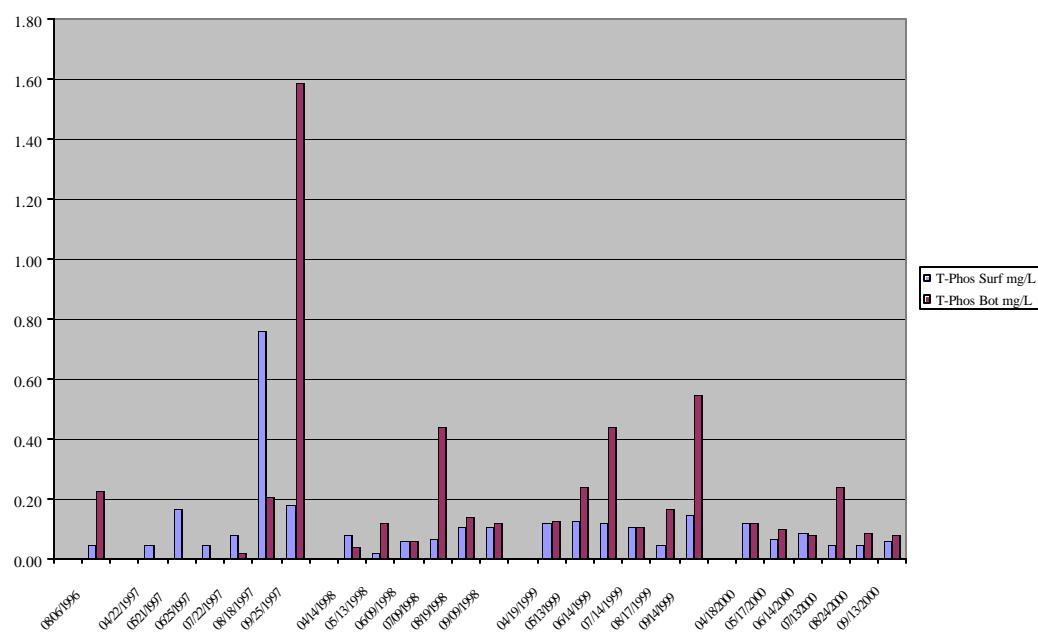


FIGURE 12: PE-13



the MCL of 3 ug/L set by EPA. The mean and maximum atrazine concentrations in the surface waters of the lake were as follows, 1.05 ug/L and 1.37 ug/L (PE-2); 1.25 ug/L and 2.09 ug/L (PE-6); 0.99 ug/L and 1.35 ug/L (PE-13), respectively. Bottom mean and maximum atrazine concentrations

for the above areas were 1.03 ug/L and 1.40 ug/L; 1.06 ug/L and 1.44 ug/L; and 1.08 ug/L and 1.28 ug/L, respectively.

Figures 13, 14, and 15 show the trend for atrazine for the years 1996-2000. As can be seen from these graphs high concentrations occur throughout the lake in early spring during the high application, high run-off

FIGURE 13: PE-2

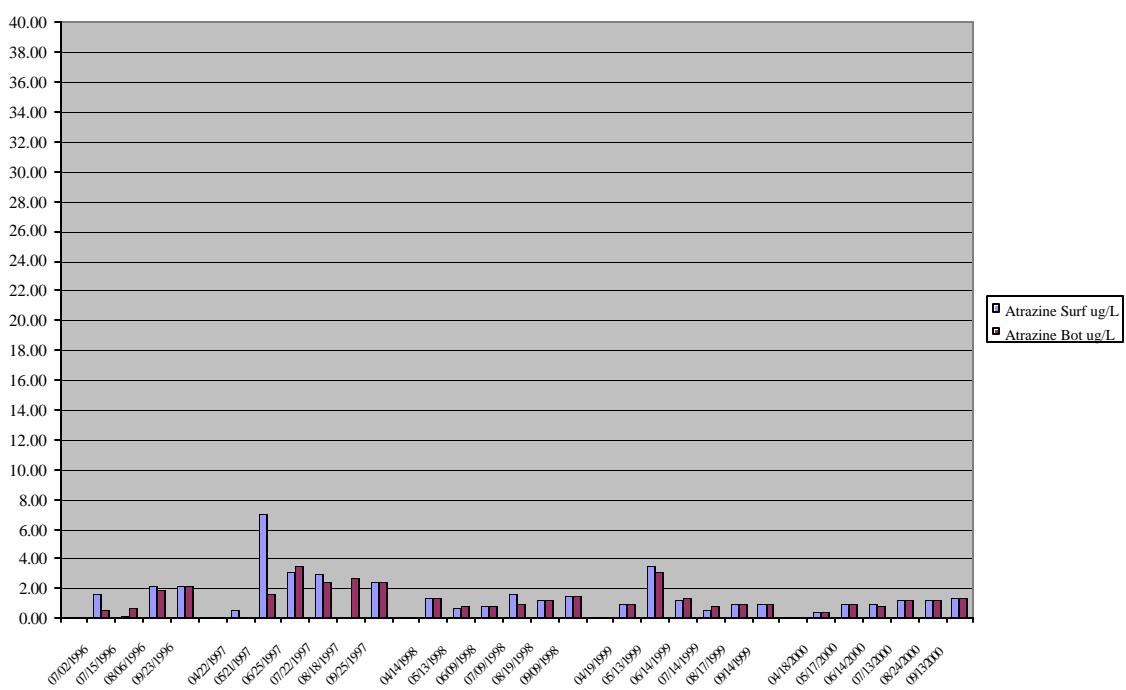
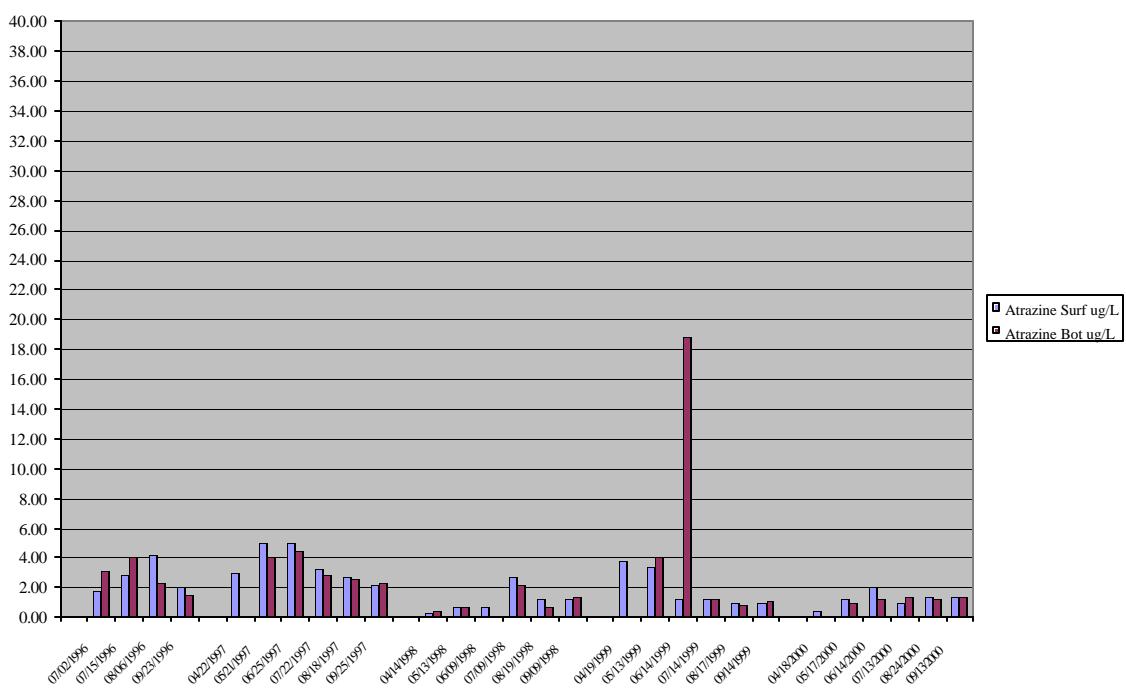


FIGURE 14: PE-6



periods and level off. For the most part concentrations are uniform throughout the water column and the lake. Metolachlor was detected in 100% of the samples also. The mean and maximum metolachlor concentrations in the surface waters were 0.69 ug/L and 1.12 ug/L (PE-2); 0.77 ug/L and 1.00 ug/L (PE-6); and 0.78 ug/L and 1.09 ug/L (PE-13), respectively. Bottom mean and maximum metolachlor concentrations for the above areas were 1.39 ug/L and 0.87 ug/L; 0.98 ug/L and 0.70 ug/L; and 1.27 ug/L and 0.90 ug/L, respectively. Although alachlor and cyanazine were detected, concentrations were low and no samples exceeded the EPA established criteria.

FIGURE 15: PE-13

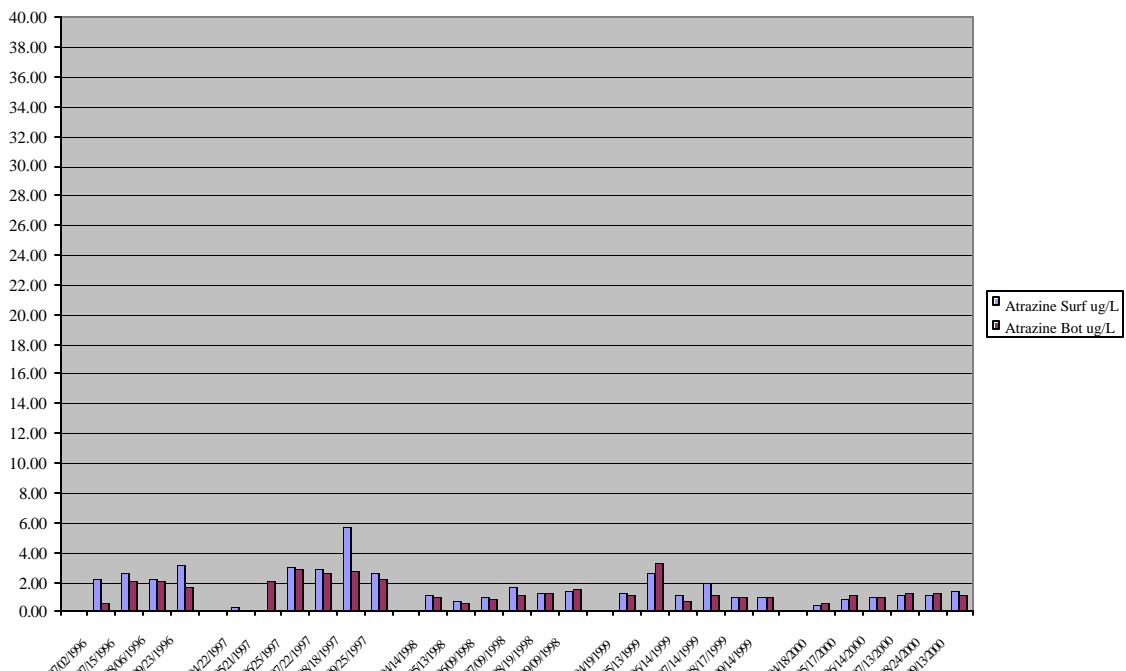
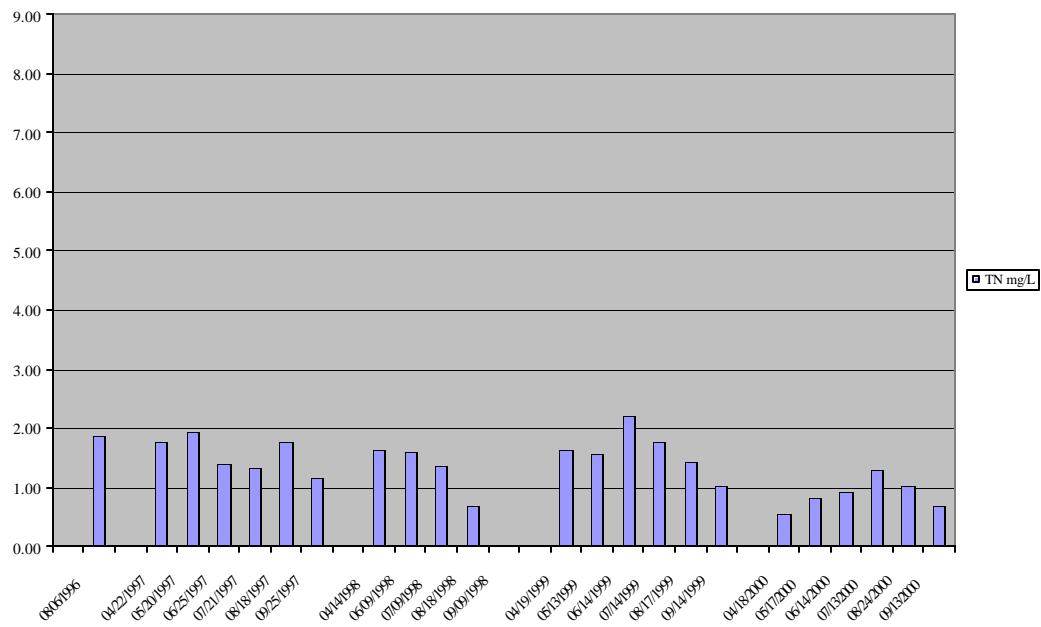


FIGURE 16: PE-1



0.15 mg/L, were indicative of moderate to high nutrient enrichment in the outlet waters of Perry Lake. Figures 16 and 17 show this trend from 1996-2000. Again, concentrations are higher during high flow periods and have been lower this year due to the near drought conditions.

Herbicides

detected in the

outlet were

atrazine,

metolachlor,

alachlor, and

cyanazine.

The mean and maximum

atrazine

concentrations

were 0.90

ug/L and 1.33

ug/L,

respectively.

None of the

samples

exceeded the

EPA criterion

of 3 ug/L for

drinking water.

Figure 18 shows the trend for the years 1996-2000. As can be seen from this

graph, there

was a

decrease in

atrazine

concentrations

in the outlet

during most of

the 1999 and

2000

sampling

periods. The

mean and

maximum

alachlor

concentrations

were 0.48

ug/L and 0.60

ug/L,

respectively.

The mean and

maximum

FIGURE 17: PE-1

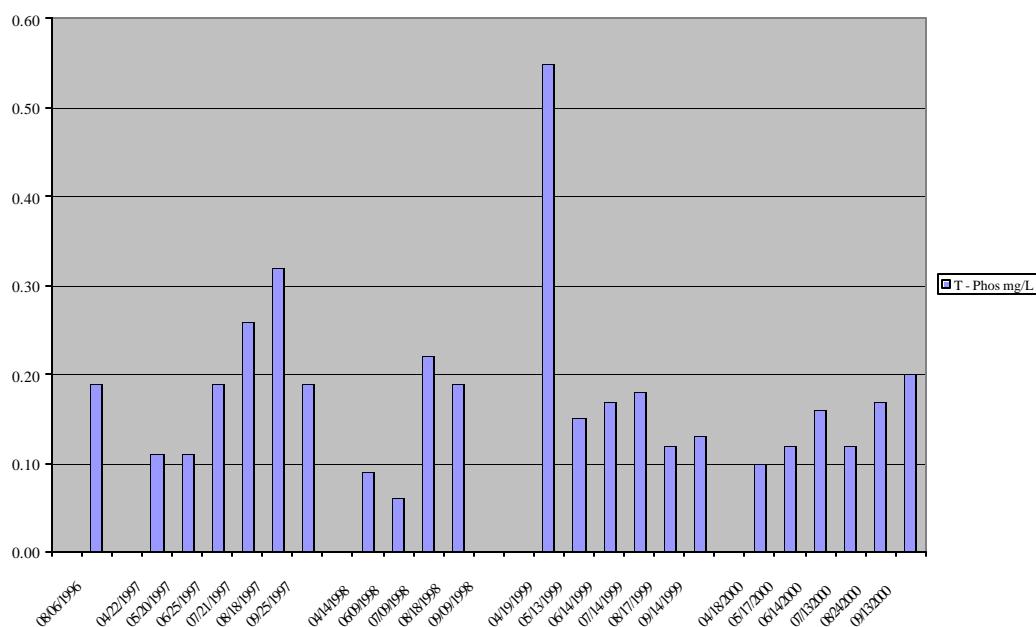
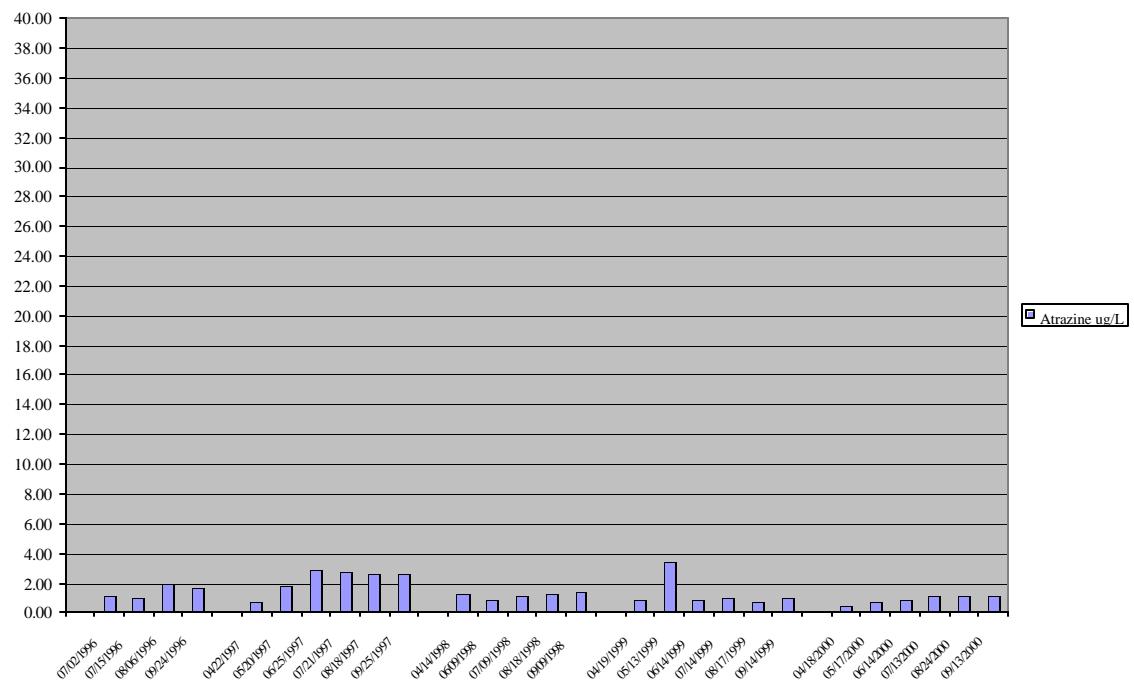


FIGURE 18: PE-1



metolachlor concentrations were 0.90 ug/L and 1.37 ug/L, respectively. None of the samples exceeded established EPA criteria.

4. Future conditions.

Although the overall water quality of Perry Lake is satisfactory as evidenced by the continued excellent crappie fishery, the excessive sedimentation, turbidity, suspended solids, nutrient loading, and pesticide levels associated with watershed run-off must be addressed. The pesticide levels pose a continuing threat to the drinking water supplies for the project. Additional water treatment removes pesticides and organic carbons, but cost effectiveness is not yet ascertainable. A special pesticide application district has been established to reduce watershed contributions.

5. Recommendations.

With the current staffing and funding levels, the water quality surveillance program for Perry Lake will continue to be limited in 2001. Routine, monthly pesticide sampling should continue to be conducted by Project personnel with logistic and analytical support from PM-PR-W. The District should enlist the other state and Federal agencies in developing a cooperative water quality monitoring and abatement program for Perry Lake and its watershed in 2002 similar to the one currently underway for Hillsdale Lake and the Big Bull watershed.

TABLE 1: PERRY LAKE DATA 1996-2000

| Station | Depth M | Date mm/dd/yy | Time hh/mm | Atrazine ug/L | Alachlor ug/L | Metolachlor ug/L | Cyanazine ug/L | Acetochlor ug/L | Ammonia mg/L | NO3/NO2 mg/L | TKN mg/L | TN mg/L | T - Phos mg/L | T - Ortho-P mg/L |
|---------|---------|---------------|------------|---------------|---------------|------------------|----------------|-----------------|--------------|--------------|----------|---------|---------------|------------------|
| PE - 29 | 0.1 | 07/02/1996 | 1130 | 1.88 | 0.44 | 0.77 | 0.08 | | | | | | | |
| | 0.1 | 07/15/1996 | 1435 | 1.65 | 0.41 | 0.11 | 0.05 | | | | | | | |
| | 0.1 | 08/08/1996 | 1315 | 0.46 | 0.05 | 0.41 | 0.09 | | | | | | | |
| | 0.1 | 09/24/1996 | 0912 | 0.25 | 0.06 | 0.07 | <0.04 | | | | | | | |
| Average | | | | 1.06 | 0.24 | 0.34 | 0.07 | | | | | | | |
| PE - 29 | 0.1 | 04/22/1997 | 1050 | 0.48 | 0.07 | 0.42 | 0.11 | | | | | | | |
| | 0.1 | 05/20/1997 | 1050 | 2.70 | 0.38 | 1.67 | 0.33 | | | | | | | |
| | 0.1 | 06/25/1997 | 1515 | 2.21 | 0.96 | 0.75 | 0.24 | | | | | | | |
| | 0.1 | 07/21/1997 | 1030 | 1.86 | 0.60 | 0.92 | 0.18 | | | | | | | |
| | 0.1 | 08/18/1997 | 1505 | 1.01 | 0.65 | 1.07 | 0.07 | | | | | | | |
| | 0.1 | 09/25/1997 | 1430 | 0.19 | 0.10 | 0.05 | 0.04 | | | | | | | |
| Average | | | | 1.41 | 0.46 | 0.81 | 0.16 | | | | | | | |
| PE - 29 | 0.1 | 04/14/1998 | 1130 | 0.09 | <0.05 | 0.07 | <0.04 | | | | | | | |
| | 0.1 | 06/09/1998 | 1140 | 4.81 | 1.09 | 3.53 | 0.30 | | | | | | | |
| | 0.1 | 07/09/1998 | 1440 | 2.14 | 0.58 | 1.08 | 0.14 | | | | | | | |
| | 0.1 | 08/18/1998 | 1000 | 0.27 | <0.05 | 0.15 | <0.04 | | | | | | | |
| | 0.1 | 09/09/1998 | 1120 | 0.35 | 0.07 | 0.12 | 0.05 | | | | | | | |
| Average | | | | 1.53 | 0.58 | 0.99 | 0.16 | | | | | | | |
| PE - 29 | 0.1 | 04/19/1999 | 1225 | 4.53 | 0.71 | 3.45 | 0.21 | | | | | | | |
| | 0.1 | 05/13/1999 | 1400 | 3.78 | 0.68 | 2.32 | 0.16 | | | | | | | |
| | 0.1 | 06/14/1999 | 1200 | 38.50 | 4.90 | 14.9 | 0.36 | | | | | | | |
| | 0.1 | 07/14/1999 | 0900 | 0.56 | 0.12 | 0.32 | 0.09 | | | | | | | |
| | 0.1 | 08/17/1999 | 1225 | 0.27 | 0.06 | 0.15 | <0.04 | | | | | | | |
| | 0.1 | 09/14/1999 | 1100 | 0.15 | 0.05 | 0.10 | <0.04 | | | | | | | |
| Average | | | | 7.97 | 1.09 | 3.54 | 0.21 | | | | | | | |
| PE-29 | 0.1 | 04/18/2000 | 1145 | 0.12 | 0.12 | 0.19 | <0.04 | | | | | | | |
| | 0.1 | 05/17/2000 | 1035 | 2.21 | 0.19 | 0.70 | 0.19 | | | | | | | |
| | 0.1 | 06/14/2000 | 0940 | 2.54 | 0.43 | 0.21 | 0.12 | | | | | | | |
| | 0.1 | 07/13/2000 | 1110 | 1.37 | 0.23 | 0.50 | 0.11 | <0.04 | | | | | | |
| | 0.1 | 08/24/2000 | 1115 | 0.39 | 0.08 | 0.12 | 0.07 | | | | | | | |
| | 0.1 | 09/13/2000 | 1115 | 0.07 | <0.05 | <0.05 | <0.04 | | | | | | | |
| Average | | | | 1.12 | 0.21 | 0.34 | 0.12 | | | | | | | |
| PE - 17 | 0.1 | 07/02/1996 | 1300 | 1.13 | 0.23 | <0.05 | <0.04 | | | | | | | |
| | 0.1 | 07/15/1996 | 1500 | 2.51 | 1.29 | <0.05 | 0.06 | | | | | | | |
| | 0.1 | 08/08/1996 | 1200 | 1.71 | 0.69 | <0.05 | 0.16 | | | | | | | |
| | 0.1 | 09/24/1996 | 0830 | 0.16 | <0.05 | <0.05 | <0.04 | | | | | | | |
| Average | | | | 1.38 | 0.74 | | 0.11 | | | | | | | |

| Station | Depth M | Date mm/dd/yy | Time hh/mm | Atrazine ug/L | Alachlor ug/L | Metolachlor ug/L | Cyanazine ug/L | Acetochlor ug/L | Ammonia mg/L | NO3/NO2 mg/L | TKN mg/L | TN mg/L | T - Phos mg/L | T - Ortho-P mg/L |
|---------|---------|---------------|------------|---------------|---------------|------------------|----------------|-----------------|--------------|--------------|----------|---------|---------------|------------------|
| PE - 17 | 0.1 | 04/22/1997 | 1110 | <0.05 | 0.13 | <0.05 | 0.06 | | 0.10 | 0.41 | 0.60 | 1.11 | 0.03 | 0.32 |
| | 0.1 | 05/20/1997 | 0930 | 0.58 | 0.30 | <0.05 | 0.16 | | 0.09 | 0.21 | 0.90 | 1.20 | 0.07 | 0.01 |
| | 0.1 | 06/25/1997 | 1425 | 2.24 | 1.35 | <0.05 | 0.11 | | 0.06 | 0.34 | 0.90 | 1.30 | 0.07 | 0.04 |
| | 0.1 | 07/21/1997 | 0940 | 1.27 | 0.96 | <0.05 | 0.05 | | 0.11 | 0.51 | 0.70 | 1.32 | 0.24 | 0.05 |
| | 0.1 | 08/18/1997 | 1420 | 0.50 | 0.81 | <0.05 | 0.04 | | 0.81 | 0.06 | 0.80 | 1.67 | 0.39 | 0.01 |
| | 0.1 | 09/25/1997 | 1340 | 0.25 | 0.29 | <0.05 | 0.05 | | 0.08 | 0.06 | 0.70 | 0.84 | 0.22 | 0.04 |
| Average | | | | 0.97 | 0.64 | | 0.08 | | 0.21 | 0.27 | 0.77 | 1.24 | 0.17 | 0.08 |
| PE - 17 | 0.1 | 04/14/1998 | 1045 | <0.05 | 0.07 | 0.06 | <0.04 | | 0.02 | 0.10 | 0.40 | 0.52 | 0.02 | 0.02 |
| | 0.1 | 06/09/1998 | 1100 | 0.58 | 0.68 | 0.05 | 0.05 | | 0.14 | 0.42 | 0.70 | 1.26 | 0.09 | 0.04 |
| | 0.1 | 07/09/1998 | 1525 | 0.87 | 0.80 | <0.05 | 0.06 | | 0.04 | 0.38 | 0.50 | 0.92 | 0.13 | 0.02 |
| | 0.1 | 08/18/1998 | 1100 | 0.10 | 0.18 | <0.05 | <0.04 | | <0.02 | 0.29 | 0.30 | 0.59 | 0.12 | 0.02 |
| | 0.1 | 09/09/1998 | 1245 | 0.15 | 0.14 | <0.05 | <0.04 | | <0.02 | <0.01 | <0.1 | 0.00 | <0.01 | 0.04 |
| | Average | | | 0.43 | 0.37 | 0.06 | 0.06 | | 0.07 | 0.30 | 0.48 | 0.66 | 0.09 | 0.03 |
| PE - 17 | 0.1 | 04/19/1999 | 1100 | <0.05 | 0.09 | <0.05 | <0.04 | | U | 1.08 | 0.28 | 1.36 | 0.13 | 0.06 |
| | 0.1 | 05/13/1999 | 1453 | 0.06 | 0.70 | <0.05 | <0.04 | | 0.10 | 1.26 | 0.42 | 1.78 | 0.09 | 0.03 |
| | 0.1 | 06/14/1999 | 1315 | 1.84 | 3.28 | 0.16 | 0.10 | | 0.02 | 0.62 | 0.45 | 1.09 | 0.08 | 0.03 |
| | 0.1 | 07/14/1999 | 1000 | 0.17 | 0.69 | <0.05 | 0.12 | | 0.02 | 0.48 | 0.13 | 0.63 | 0.04 | U |
| | 0.1 | 08/17/1999 | 1100 | 0.17 | 0.29 | 0.06 | <0.04 | | 0.03 | 0.03 | 0.28 | 0.34 | 0.04 | 0.01 |
| | 0.1 | 09/14/1999 | 1220 | 0.08 | 0.19 | <0.05 | <0.04 | | U | U | 0.28 | 0.28 | 0.11 | 0.01 |
| Average | | | | 0.46 | 0.87 | 0.11 | 0.11 | | 0.04 | 0.69 | 0.31 | 0.91 | 0.08 | 0.03 |
| PE-17 | 0.1 | 04/18/2000 | 1345 | <0.05 | 0.13 | 0.11 | <0.04 | | 0.03 | U | 2.00 | 2.03 | 0.22 | U |
| | 0.1 | 05/17/2000 | 1125 | 2.76 | 4.80 | 0.53 | 0.09 | | 0.05 | 0.16 | 1.00 | 1.21 | 0.18 | 0.02 |
| | 0.1 | 06/14/2000 | 0845 | 2.54 | 17.60 | 0.12 | 0.11 | | 0.04 | 0.86 | 3.00 | 3.90 | 0.87 | 0.07 |
| | 0.1 | 07/13/2000 | 1100 | 0.51 | 0.47 | <0.05 | 0.07 | <0.04 | 0.08 | 0.15 | 0.31 | 0.54 | 0.05 | 0.02 |
| | 0.1 | 08/24/2000 | 1230 | 0.25 | 0.25 | 0.06 | <0.04 | | 0.05 | U | 2.00 | 2.05 | 0.27 | 0.02 |
| | 0.1 | 09/13/2000 | | | 1.52 | 4.65 | 0.21 | 0.09 | | 0.05 | 0.39 | 1.66 | 1.95 | 0.32 |
| PE - 1 | 0.1 | 07/02/1996 | 1250 | 1.10 | 1.75 | 1.62 | 0.10 | | | | | | | |
| | 0.1 | 07/15/1996 | 1530 | 1.02 | 1.44 | 0.50 | 0.05 | | | | | | | |
| | 0.1 | 08/06/1996 | 1530 | 1.98 | 1.24 | 1.77 | 0.18 | | 0.04 | 0.32 | 1.50 | 1.86 | 0.19 | 0.11 |
| | 0.1 | 09/24/1996 | 0800 | 1.68 | 0.84 | 1.08 | 0.09 | | | | | | | |
| Average | | | | 1.45 | 1.32 | 1.24 | 0.11 | | 0.04 | 0.32 | 1.50 | 1.86 | 0.19 | 0.11 |
| PE - 1 | 0.1 | 04/22/1997 | 0845 | 0.79 | 0.43 | 0.55 | 0.16 | | 0.02 | 0.75 | 1.00 | 1.77 | 0.11 | 0.11 |
| | 0.1 | 05/20/1997 | 0900 | 1.82 | 0.38 | 1.25 | 0.08 | | 0.09 | 0.95 | 0.90 | 1.94 | 0.11 | 0.07 |
| | 0.1 | 06/25/1997 | 1145 | 2.87 | 1.06 | 1.43 | 0.20 | | 0.16 | 0.15 | 1.10 | 1.41 | 0.19 | 0.09 |
| | 0.1 | 07/21/1997 | 1200 | 2.71 | 0.61 | 0.75 | 0.17 | | 0.37 | 0.45 | 0.50 | 1.32 | 0.26 | 0.12 |
| | 0.1 | 08/18/1997 | 1150 | 2.63 | 0.50 | 1.17 | 0.14 | | 0.10 | 0.17 | 1.50 | 1.77 | 0.32 | 0.14 |
| | 0.1 | 09/25/1997 | 1315 | 2.68 | 0.45 | 0.71 | 0.28 | | 0.09 | 0.18 | 0.90 | 1.17 | 0.19 | 0.04 |
| Average | | | | 2.25 | 0.57 | 0.98 | 0.17 | | 0.14 | 0.44 | 0.98 | 1.56 | 0.20 | 0.10 |

| Station | Depth M | Date mm/dd/yy | Time hh/mm | Atrazine ug/L | Alachlor ug/L | Metolachlor ug/L | Cyanazine ug/L | Acetochlor ug/L | Ammonia mg/L | NO3/NO2 mg/L | TKN mg/L | TN mg/L | T - Phos mg/L | T - Ortho-P mg/L |
|---------|---------|---------------|------------|---------------|---------------|------------------|----------------|-----------------|--------------|--------------|----------|---------|---------------|------------------|
| PE - 1 | 0.1 | 04/14/1998 | 1600 | 1.24 | 0.16 | 0.29 | 0.12 | | 0.20 | 0.53 | 0.90 | 1.63 | 0.09 | 0.07 |
| | 0.1 | 06/09/1998 | 1500 | 0.84 | 0.15 | 0.25 | 0.07 | | 0.25 | 0.64 | 0.70 | 1.59 | 0.06 | 0.05 |
| | 0.1 | 07/09/1998 | 1015 | 1.09 | 0.32 | 0.32 | 0.09 | | 0.35 | 0.53 | 0.50 | 1.38 | 0.22 | 0.05 |
| | 0.1 | 08/18/1998 | 0900 | 1.24 | 0.83 | 0.63 | 0.07 | | <0.02 | 0.29 | 0.40 | 0.69 | 0.19 | 0.08 |
| | 0.1 | 09/09/1998 | 1430 | 1.47 | 0.48 | 0.79 | 0.12 | | | | | | | |
| Average | | | | 1.18 | 0.39 | 0.46 | 0.09 | | 0.27 | 0.50 | 0.63 | 1.32 | 0.14 | 0.06 |
| PE - 1 | 0.1 | 04/19/1999 | 1445 | 0.81 | <0.05 | 0.39 | 0.08 | | U | 0.63 | 0.99 | 1.62 | 0.55 | 0.04 |
| | 0.1 | 05/13/1999 | 1525 | 3.44 | 0.35 | 1.91 | 0.18 | | 0.39 | 0.34 | 0.85 | 1.58 | 0.15 | 0.08 |
| | 0.1 | 06/14/1999 | 1440 | 0.93 | 0.71 | 2.49 | 0.06 | | U | 1.59 | 0.62 | 2.21 | 0.17 | 0.07 |
| | 0.1 | 07/14/1999 | 1025 | 0.98 | 1.26 | 2.72 | 0.10 | | 0.06 | 1.35 | 0.37 | 1.78 | 0.18 | 0.10 |
| | 0.1 | 08/17/1999 | 1325 | 0.77 | 1.20 | 2.34 | 0.05 | | U | 0.07 | 1.36 | 1.43 | 0.12 | 0.03 |
| | 0.1 | 09/14/1999 | 1300 | 1.00 | 0.98 | 2.16 | 0.05 | | U | 0.69 | 0.35 | 1.04 | 0.13 | 0.07 |
| Average | | | | 1.32 | 0.90 | 2.00 | 0.09 | | 0.23 | 0.78 | 0.76 | 1.61 | 0.22 | 0.07 |
| PE-1 | 0.1 | 04/18/2000 | 1415 | 0.45 | 0.60 | 1.37 | <0.04 | | 0.03 | U | 0.51 | 0.54 | 0.10 | U |
| | 0.1 | 05/17/2000 | 1300 | 0.73 | 0.46 | 1.17 | 0.09 | | 0.05 | U | 0.76 | 0.81 | 0.12 | 0.04 |
| | 0.1 | 06/14/2000 | 1315 | 0.85 | 0.44 | 0.90 | <0.04 | | 0.13 | 0.05 | 0.73 | 0.91 | 0.16 | 0.05 |
| | 0.1 | 07/13/2000 | 1115 | 1.09 | 0.43 | 0.87 | 0.09 | <0.04 | 0.65 | 0.02 | 0.61 | 1.28 | 0.12 | 0.06 |
| | 0.1 | 08/24/2000 | 1335 | 1.13 | 0.54 | 0.64 | 0.10 | | 0.02 | U | 1.00 | 1.02 | 0.17 | 0.07 |
| | 0.1 | 09/13/2000 | 1400 | 1.13 | 0.42 | 0.46 | 0.11 | | U | U | 0.70 | 0.70 | 0.20 | 0.20 |
| Average | | | | 0.90 | 0.48 | 0.90 | 0.10 | | 0.18 | 0.04 | 0.72 | 0.88 | 0.15 | 0.08 |
| PE - 2 | 0.1 | 07/02/1996 | 1045 | 1.63 | 1.68 | 2.08 | 0.18 | | | | | | | |
| | 0.1 | 07/15/1996 | 1035 | 0.20 | 0.70 | 2.00 | <0.04 | | | | | | | |
| | 0.1 | 08/06/1996 | 1300 | 2.18 | 1.14 | 1.88 | 0.19 | | <0.02 | 0.32 | 7.80 | 8.12 | 0.10 | 0.05 |
| | 0.1 | 09/23/1996 | 1500 | 2.25 | 2.06 | 1.39 | 0.08 | | | | | | | |
| Average | | | | 1.57 | 1.40 | 1.84 | 0.15 | | | 0.32 | 7.80 | 8.12 | 0.10 | 0.05 |
| PE - 2 | 0.1 | 04/22/1997 | 0830 | 0.61 | 0.26 | 0.42 | 0.14 | | <0.02 | 0.71 | 0.70 | 1.41 | 0.07 | 0.07 |
| | 0.1 | 05/21/1997 | 0900 | 7.00 | <0.05 | 0.90 | <0.04 | | 0.15 | 0.97 | 1.00 | 2.12 | 0.13 | 0.07 |
| | 0.1 | 06/25/1997 | 1100 | 3.11 | 1.01 | 1.44 | 0.21 | | 0.12 | 1.02 | 1.10 | 2.24 | 0.07 | 0.04 |
| | 0.1 | 07/22/1997 | 1005 | 2.96 | 0.57 | 1.45 | 0.19 | | <0.02 | 0.21 | 0.30 | 0.51 | 0.01 | 0.01 |
| | 0.1 | 08/18/1997 | 0915 | <0.05 | 0.36 | 0.94 | 0.17 | | 0.03 | 0.06 | 0.90 | 0.99 | 0.17 | 0.03 |
| | 0.1 | 09/25/1997 | 1115 | 2.50 | 0.37 | 0.60 | 0.25 | | 0.05 | 0.21 | 0.60 | 0.86 | 0.16 | 0.03 |
| Average | | | | 3.24 | 0.51 | 0.96 | 0.19 | | 0.09 | 0.53 | 0.77 | 1.36 | 0.10 | 0.04 |
| PE - 2 | 0.1 | 04/14/1998 | 1515 | 1.34 | 0.19 | 0.32 | 0.11 | | 0.17 | 0.51 | 0.60 | 1.28 | 0.05 | 0.05 |
| | 0.1 | 05/13/1998 | 0935 | 0.68 | 0.20 | 0.16 | 0.08 | | 0.13 | 0.73 | 0.50 | 1.36 | 0.08 | 0.01 |
| | 0.1 | 06/09/1998 | 0945 | 0.86 | 0.20 | 0.24 | 0.07 | | 0.19 | 0.57 | 0.60 | 1.36 | 0.03 | 0.03 |
| | 0.1 | 07/09/1998 | 0940 | 1.60 | 0.48 | 0.52 | 0.12 | | 0.12 | 0.22 | 0.30 | 0.64 | 0.08 | 0.02 |
| | 0.1 | 08/19/1998 | 1320 | 1.28 | 0.43 | 0.65 | 0.11 | | <0.02 | 0.03 | 0.70 | 0.73 | 0.13 | 0.02 |
| | 0.1 | 09/09/1998 | 1400 | 1.58 | 0.38 | 1.46 | 0.13 | | 0.05 | 0.03 | 0.50 | 0.58 | 0.09 | 0.06 |
| Average | | | | 1.22 | 0.31 | 0.56 | 0.10 | | 0.13 | 0.35 | 0.53 | 0.99 | 0.08 | 0.03 |

| Station | Depth M | Date mm/dd/yy | Time hh/mm | Atrazine ug/L | Alachlor ug/L | Metolachlor ug/L | Cyanazine ug/L | Acetochlor ug/L | Ammonia mg/L | NO3/NO2 mg/L | TKN mg/L | TN mg/L | T - Phos mg/L | T - Ortho-P mg/L |
|---------|------------|------------------|---------------|------------------|------------------|---------------------|-------------------|--------------------|-----------------|-----------------|-------------|------------|------------------|---------------------|
| PE - 2 | 0.1 | 04/19/1999 | 1050 | 1.00 | 0.14 | 0.51 | 0.08 | | U | 0.69 | 0.52 | 1.21 | 0.10 | 0.07 |
| | 0.1 | 05/13/1999 | 1050 | 3.53 | 0.22 | 1.94 | 0.19 | | 0.24 | 0.51 | 0.77 | 1.52 | 0.15 | 0.07 |
| | 0.1 | 06/14/1999 | 0900 | 1.31 | 0.71 | 2.17 | 0.08 | | 0.04 | 1.60 | 0.51 | 2.15 | 0.09 | 0.08 |
| | 0.1 | 07/14/1999 | 1155 | 0.62 | 1.40 | 3.07 | 0.26 | | 0.09 | 1.44 | 0.38 | 1.91 | 0.14 | 0.09 |
| | 0.1 | 08/17/1999 | 0900 | 1.04 | 1.14 | 2.00 | 0.06 | | U | 0.90 | 0.37 | 1.27 | 0.15 | 0.06 |
| | 0.1 | 09/14/1999 | 0900 | 0.95 | 0.97 | 2.22 | 0.05 | | U | 0.69 | 0.33 | 1.02 | 0.13 | 0.07 |
| Average | | | | 1.41 | 0.76 | 1.99 | 0.12 | | 0.12 | 0.97 | 0.48 | 1.51 | 0.13 | 0.07 |
| PE-2 | 0.1 | 04/18/2000 | 0910 | 0.46 | 0.56 | 1.12 | <0.04 | | U | U | 0.59 | 0.59 | 0.09 | 0.01 |
| | 0.1 | 05/17/2000 | 0745 | 0.93 | 0.50 | 0.37 | 0.15 | | 0.02 | U | 0.47 | 0.49 | 0.05 | 0.02 |
| | 0.1 | 06/14/2000 | 1100 | 1.05 | 0.32 | 0.48 | <0.04 | | 0.12 | 0.01 | 0.46 | 0.59 | 0.17 | 0.02 |
| | 0.1 | 07/13/2000 | 0915 | 1.23 | 0.42 | 0.90 | 0.11 | <0.04 | 0.08 | U | 0.70 | 0.78 | 0.05 | U |
| | 0.1 | 08/24/2000 | 0915 | 1.27 | 0.41 | 0.66 | 0.11 | | 0.03 | U | 0.78 | 0.81 | 0.04 | 0.02 |
| | 0.1 | 09/13/2000 | 0900 | 1.37 | 0.45 | 0.58 | 0.12 | | U | 0.07 | 0.20 | 0.27 | 0.06 | 0.03 |
| Average | | | | 1.05 | 0.44 | 0.69 | 0.12 | | 0.06 | 0.04 | 0.53 | 0.59 | 0.08 | 0.02 |
| PE - 2 | 20.0 | 07/02/1996 | 1105 | 0.61 | 1.99 | 2.14 | <0.04 | | | | | | | |
| | 14.5 | 07/15/1996 | 1050 | 0.66 | 1.69 | 0.36 | <0.04 | | | | | | | |
| | 16.0 | 08/06/1996 | 1316 | 1.91 | 1.26 | 1.46 | 0.16 | | 0.16 | 0.30 | | 0.46 | | 0.15 |
| | 21.0 | 09/23/1996 | 1521 | 2.22 | 0.94 | 3.86 | 0.09 | | | | | | | |
| Average | | | | 1.35 | 1.47 | 1.96 | 0.13 | | 0.16 | 0.30 | | 0.46 | | 0.15 |
| PE - 2 | 16.0 | 04/22/1997 | 0846 | | | | | | | | | | | |
| | 16.0 | 05/21/1997 | 0916 | 1.64 | 0.42 | 1.20 | 0.09 | | | | | | | |
| | 11.0 | 06/25/1997 | 1111 | 3.50 | 1.28 | 1.59 | 0.26 | | | | | | | |
| | 16.0 | 07/22/1997 | 1021 | 2.46 | 0.43 | 1.61 | 0.16 | | 0.38 | 0.42 | 0.50 | 1.30 | 0.28 | 0.10 |
| | 16.0 | 08/18/1997 | 0931 | 2.73 | 0.65 | 1.10 | 0.21 | | 0.81 | 0.10 | 1.70 | 2.61 | 0.48 | 0.15 |
| | 16.0 | 09/25/1997 | 1131 | 2.50 | 0.36 | 0.64 | 0.25 | | 0.09 | 0.29 | 1.30 | 1.68 | 0.33 | 0.06 |
| Average | | | | 2.57 | 0.63 | 1.23 | 0.19 | | 0.43 | 0.27 | 1.17 | 1.86 | 0.36 | 0.10 |
| PE - 2 | 8.0 | 04/14/1998 | 1523 | 1.36 | 0.22 | 0.35 | 0.13 | | 0.19 | 0.54 | 1.10 | 1.83 | 0.05 | 0.04 |
| | 6.0 | 05/13/1998 | 0941 | 0.82 | 0.24 | 0.19 | 0.07 | | 0.18 | 0.78 | 0.60 | 1.56 | 0.11 | 0.03 |
| | 11.0 | 06/09/1998 | 0956 | 0.79 | 0.19 | 0.24 | 0.08 | | 0.20 | 0.61 | 0.40 | 1.21 | 0.04 | 0.03 |
| | 12.0 | 07/09/1998 | 0952 | 1.03 | 0.30 | 0.25 | 0.09 | | 0.05 | 0.66 | 0.50 | 1.21 | 0.10 | 0.04 |
| | 6.0 | 08/19/1998 | 1326 | 1.28 | 0.33 | 0.51 | 0.11 | | 0.03 | 0.34 | 0.70 | 1.07 | 0.13 | 0.05 |
| | 8.0 | 09/09/1998 | 1408 | 1.54 | 0.35 | 0.63 | 0.13 | | 0.07 | 0.07 | 0.50 | 0.64 | 0.13 | 0.04 |
| Average | | | | 1.14 | 0.27 | 0.36 | 0.10 | | 0.12 | 0.50 | 0.63 | 1.25 | 0.09 | 0.04 |
| PE - 2 | 11.0 | 04/19/1999 | 1101 | 0.95 | 0.13 | 0.49 | 0.07 | | U | 0.70 | 0.74 | 1.44 | 0.11 | 0.07 |
| | 21.0 | 05/13/1999 | 1111 | 3.13 | 0.35 | 1.81 | 0.15 | | 0.48 | 0.49 | 0.72 | 1.69 | 0.15 | 0.06 |
| | 15.0 | 06/14/1999 | 0915 | 1.33 | 0.82 | 2.33 | 0.09 | | 0.05 | 1.62 | 0.86 | 2.53 | 0.13 | 0.09 |
| | 6.0 | 07/14/1999 | 1201 | 0.91 | 1.54 | 2.81 | 0.28 | | 0.07 | 1.35 | 0.99 | 2.41 | 0.18 | 0.04 |
| | 12 | 08/17/1999 | 0912 | 0.98 | 1.14 | 2.03 | 0.05 | | 0.04 | 0.96 | 0.80 | 1.80 | 0.08 | 0.07 |
| | 15.0 | 09/14/1999 | 0915 | 0.98 | 1.00 | 2.35 | 0.08 | | U | 0.69 | 0.66 | 1.35 | 0.14 | 0.06 |
| Average | | | | 1.38 | 0.83 | 1.97 | 0.12 | | 0.16 | 0.97 | 0.80 | 1.87 | 0.13 | 0.07 |

| Station | Depth M | Date mm/dd/yy | Time hh/mm | Atrazine ug/L | Alachlor ug/L | Metolachlor ug/L | Cyanazine ug/L | Acetochlor ug/L | Ammonia mg/L | NO3/NO2 mg/L | TKN mg/L | TN mg/L | T - Phos mg/L | T - Ortho-P mg/L |
|---------|------------|------------------|---------------|------------------|------------------|---------------------|-------------------|--------------------|-----------------|-----------------|-------------|------------|------------------|---------------------|
| PE-2 | 8.0 | 04/18/2000 | 0918 | 0.48 | 0.62 | 1.39 | <0.04 | | 0.05 | U | 0.52 | 0.57 | 0.07 | U |
| | 11.0 | 05/17/2000 | 0756 | 1.00 | 0.23 | 0.95 | 0.11 | | 0.05 | U | 0.70 | 0.75 | 0.07 | 0.03 |
| | 16.0 | 06/14/2000 | 1116 | 0.82 | 0.48 | 0.66 | 0.11 | | 0.99 | U | | 0.99 | | 0.19 |
| | 17.0 | 07/13/2000 | 0932 | 1.26 | 0.51 | 0.98 | 0.09 | <0.04 | 0.76 | U | 0.78 | 1.54 | 0.19 | 0.11 |
| | 11.0 | 08/24/2000 | 0926 | 1.21 | 0.46 | 0.65 | 0.09 | | 0.09 | U | 0.79 | 0.88 | 0.05 | 0.03 |
| | 15.0 | 09/13/2000 | 0915 | 1.40 | 0.50 | 0.57 | 0.13 | | U | 0.03 | 0.80 | 0.83 | 0.10 | 0.04 |
| Average | | | | 1.03 | 0.47 | 0.87 | 0.11 | | 0.39 | 0.03 | 0.72 | 0.93 | 0.10 | 0.08 |
| PE - 6 | 0.1 | 07/02/1996 | 1140 | 1.81 | 1.41 | 2.39 | 0.25 | | | | | | | |
| | 0.1 | 07/15/1996 | 1135 | 2.81 | 1.96 | 0.30 | 0.13 | | | | | | | |
| | 0.1 | 08/06/1996 | 1100 | 4.20 | 0.60 | 0.30 | <0.04 | | 0.17 | 0.33 | 1.10 | 1.60 | 0.09 | 0.07 |
| | 0.1 | 09/23/1996 | 1330 | 2.05 | 0.91 | 3.48 | 0.07 | | | | | | | |
| Average | | | | 2.72 | 1.22 | 1.62 | 0.15 | | 0.17 | 0.33 | 1.10 | 1.60 | 0.09 | 0.07 |
| PE - 6 | 0.1 | 04/22/1997 | 0950 | 2.97 | 0.61 | 2.19 | 0.27 | | 0.02 | 1.03 | 1.40 | 2.45 | 0.16 | 0.10 |
| | 0.1 | 05/21/1997 | 1030 | 4.98 | 4.32 | 2.36 | 0.53 | | 0.16 | 1.20 | 1.10 | 2.46 | 0.15 | 0.09 |
| | 0.1 | 06/25/1997 | 1000 | 4.99 | 1.62 | 2.06 | 0.39 | | 0.23 | 0.50 | 1.20 | 1.93 | 0.07 | 0.03 |
| | 0.1 | 07/22/1997 | 0930 | 3.29 | 0.68 | 1.74 | 0.23 | | 0.09 | 0.13 | 0.40 | 0.62 | 0.15 | 0.02 |
| | 0.1 | 08/18/1997 | 1000 | 2.75 | 0.65 | 1.10 | 0.21 | | 0.02 | 0.06 | 0.60 | 0.68 | 0.46 | 0.05 |
| | 0.1 | 09/25/1997 | 1000 | 2.22 | 0.42 | 0.64 | 0.25 | | 0.10 | 0.24 | 0.50 | 0.84 | 0.18 | 0.03 |
| Average | | | | 3.53 | 1.38 | 1.68 | 0.31 | | 0.10 | 0.53 | 0.87 | 1.50 | 0.20 | 0.05 |
| PE - 6 | 0.1 | 04/14/1998 | 1345 | 0.31 | 0.13 | 2.09 | <0.04 | | 0.26 | 1.27 | 1.10 | 2.63 | 0.21 | 0.10 |
| | 0.1 | 05/13/1998 | 1045 | 0.70 | 0.16 | 0.29 | 0.10 | | 0.09 | 0.60 | 0.60 | 1.29 | 0.04 | 0.01 |
| | 0.1 | 06/09/1998 | 0810 | 0.70 | 0.12 | 0.33 | 0.07 | | 0.27 | 0.50 | 0.80 | 1.57 | 0.08 | 0.06 |
| | 0.1 | 07/09/1998 | 0815 | 2.75 | 1.23 | 1.59 | 0.18 | | 0.27 | 0.57 | 1.00 | 1.84 | 0.16 | 0.07 |
| | 0.1 | 08/19/1998 | 1450 | 1.20 | 0.43 | 0.60 | 0.10 | | 0.09 | 0.03 | 0.40 | 0.52 | 0.12 | 0.02 |
| | 0.1 | 09/09/1998 | 1025 | 1.27 | 0.33 | 0.51 | 0.10 | | 0.05 | 0.12 | 0.90 | 1.07 | 0.16 | 0.10 |
| Average | | | | 1.16 | 0.40 | 0.90 | 0.11 | | 0.17 | 0.52 | 0.80 | 1.49 | 0.13 | 0.06 |
| PE - 6 | 0.1 | 04/19/1999 | 1135 | 3.84 | 0.50 | 2.45 | 0.18 | | 0.16 | 1.56 | 1.35 | 3.07 | 0.23 | 0.05 |
| | 0.1 | 05/13/1999 | 0950 | 3.44 | 0.38 | 1.70 | 0.16 | | 0.10 | 0.74 | 0.79 | 1.63 | 0.18 | 0.11 |
| | 0.1 | 06/14/1999 | 1020 | 1.26 | 1.88 | 3.81 | 0.09 | | 0.03 | 1.61 | 0.73 | 2.37 | 0.19 | 0.08 |
| | 0.1 | 07/14/1999 | 1345 | 1.20 | 1.30 | 2.43 | 0.31 | | 0.03 | 0.97 | 0.58 | 1.58 | 0.20 | 0.09 |
| | 0.1 | 08/17/1999 | 0925 | 1.02 | 1.10 | 1.05 | 0.09 | | 0.02 | 0.73 | 0.40 | 1.15 | 0.07 | 0.06 |
| | 0.1 | 09/14/1999 | 1000 | 1.04 | 0.80 | 2.03 | 0.07 | | U | 0.47 | 0.53 | 1.00 | 0.16 | 0.07 |
| Average | | | | 1.97 | 0.99 | 2.25 | 0.15 | | 0.07 | 1.01 | 0.73 | 1.80 | 0.17 | 0.08 |
| PE-6 | 0.1 | 04/18/2000 | 1025 | 0.39 | 0.43 | 0.98 | <0.04 | | 0.04 | U | 0.38 | 0.42 | 0.07 | 0.01 |
| | 0.1 | 05/17/2000 | 0920 | 1.19 | 0.46 | 1.00 | 0.13 | | 0.11 | U | 0.49 | 0.60 | 0.08 | 0.04 |
| | 0.1 | 06/14/2000 | 1135 | 2.09 | 0.44 | 0.48 | 0.10 | | U | U | 1.00 | 1.00 | 0.21 | 0.03 |
| | 0.1 | 07/13/2000 | 1020 | 1.03 | 0.57 | 0.96 | 0.13 | <0.04 | 0.13 | 0.27 | 0.65 | 1.05 | 0.14 | 0.06 |
| | 0.1 | 08/24/2000 | 1000 | 1.35 | 0.50 | 0.64 | 0.10 | | 0.07 | U | 0.70 | 0.77 | 0.09 | 0.04 |
| | 0.1 | 09/13/2000 | 1000 | 1.42 | 0.49 | 0.56 | 0.12 | | U | U | 0.50 | 0.50 | 0.10 | 0.04 |
| Average | | | | 1.25 | 0.48 | 0.77 | 0.12 | | 0.09 | 0.27 | 0.62 | 0.72 | 0.12 | 0.04 |

| Station | Depth M | Date mm/dd/yy | Time hh/mm | Atrazine ug/L | Alachlor ug/L | Metolachlor ug/L | Cyanazine ug/L | Acetochlor ug/L | Ammonia mg/L | NO3/NO2 mg/L | TKN mg/L | TN mg/L | T - Phos mg/L | T - Ortho-P mg/L |
|---------|------------|------------------|---------------|------------------|------------------|---------------------|-------------------|--------------------|-----------------|-----------------|-------------|------------|------------------|---------------------|
| PE - 6 | 11.0 | 07/02/1996 | 1151 | 3.20 | 1.88 | 2.09 | 0.20 | | | | | | | |
| | 6.5 | 07/15/1996 | 1142 | 4.01 | 1.55 | 0.28 | 0.19 | | | | | | | |
| | 7.0 | 08/06/1996 | 1107 | 2.29 | 1.03 | 1.34 | 0.15 | | 0.28 | 0.45 | 2.00 | 2.73 | 0.21 | 0.13 |
| | 10.0 | 09/23/1996 | 1340 | 1.49 | 0.76 | 0.79 | 0.07 | | | | | | | |
| Average | | | | 2.75 | 1.31 | 1.13 | 0.15 | | 0.28 | 0.45 | 2.00 | 2.73 | 0.21 | 0.13 |
| PE - 6 | 5.0 | 04/22/1997 | 0955 | | | | | | | | | | | |
| | 5.0 | 05/21/1997 | 1035 | 4.08 | 1.02 | 2.46 | 0.47 | | | | | | | |
| | 6.0 | 06/25/1997 | 1006 | 4.48 | 1.56 | 2.10 | 0.41 | | 0.23 | 0.49 | 1.20 | 1.92 | 0.07 | 0.04 |
| | 5.0 | 07/22/1997 | 0935 | 2.91 | 0.55 | 2.11 | 0.20 | | 0.31 | 0.11 | 0.80 | 1.22 | 0.07 | 0.05 |
| | 7.0 | 08/18/1997 | 1007 | 2.63 | 0.66 | 1.15 | 0.26 | | 0.10 | 0.06 | 1.90 | 2.06 | 0.49 | 0.06 |
| | 6.0 | 09/25/1997 | 1006 | 2.32 | 0.37 | 0.58 | 0.22 | | 0.17 | 0.07 | 0.80 | 1.04 | 0.16 | 0.03 |
| Average | | | | 3.28 | 0.83 | 1.68 | 0.31 | | 0.20 | 0.18 | 1.18 | 1.56 | 0.20 | 0.05 |
| PE - 6 | 7.0 | 04/14/1998 | 1352 | 0.41 | 0.16 | <0.05 | 0.06 | | 0.28 | 1.20 | 1.40 | 2.88 | 0.08 | 0.07 |
| | 8.0 | 05/13/1998 | 1053 | 0.66 | 0.23 | 0.24 | 0.10 | | 0.20 | 0.63 | 0.70 | 1.53 | 0.05 | 0.03 |
| | 5.0 | 06/09/1998 | 0815 | | | | | | 0.22 | 0.47 | 1.00 | 1.69 | 0.11 | 0.06 |
| | 7.0 | 07/09/1998 | 0822 | 2.19 | 0.82 | 1.06 | 0.14 | | 0.62 | 0.34 | 1.70 | 2.66 | 0.52 | 0.11 |
| | 6.0 | 08/19/1998 | 1456 | 0.65 | 0.44 | 0.51 | 0.08 | | <0.02 | 0.10 | 0.60 | 0.70 | 0.19 | 0.08 |
| | 6.0 | 09/09/1998 | 1031 | 1.33 | 0.35 | 0.48 | 0.10 | | 0.17 | 0.11 | 0.80 | 1.08 | 0.19 | 0.13 |
| Average | | | | 1.05 | 0.40 | 0.57 | 0.10 | | 0.30 | 0.48 | 1.03 | 1.76 | 0.19 | 0.08 |
| PE-6 | 12.0 | 04/19/1999 | 1147 | | | | | | | | | | | |
| | 12.0 | 05/13/1999 | 1002 | 4.01 | 0.40 | 1.77 | 0.17 | | 0.14 | 0.86 | 0.95 | 1.95 | 0.35 | 0.08 |
| | 9.0 | 06/14/1999 | 1029 | 18.80 | 3.57 | 10.50 | 0.64 | | 0.19 | 2.07 | 4.85 | 7.11 | 1.80 | 0.06 |
| | 11.0 | 07/14/1999 | 1356 | 1.24 | 1.22 | 2.51 | 0.29 | | 0.11 | 1.03 | 0.96 | 2.10 | 0.20 | 0.07 |
| | 6 | 08/17/1999 | 0931 | 0.84 | 0.86 | 1.40 | 0.06 | | 0.04 | 0.47 | 1.19 | 1.70 | 0.20 | 0.07 |
| | 6.0 | 09/14/1999 | 1006 | 1.06 | 0.98 | 2.09 | 0.06 | | U | 0.50 | 0.86 | 1.36 | 0.21 | 0.07 |
| Average | | | | 5.19 | 1.41 | 3.65 | 0.24 | | 0.12 | 0.99 | 1.76 | 2.84 | 0.55 | 0.07 |
| PE-6 | 7.0 | 04/18/2000 | 1032 | 0.09 | 0.35 | 0.61 | <0.04 | | 0.10 | U | 2.00 | 2.10 | 0.34 | U |
| | 6.0 | 05/17/2000 | 0926 | 1.05 | 0.47 | 0.95 | 0.06 | | 0.12 | U | 0.69 | 0.81 | 0.13 | 0.05 |
| | 6.0 | 06/14/2000 | 1141 | 1.23 | 0.42 | 0.55 | 0.12 | | U | U | 0.81 | 0.81 | 0.18 | 0.04 |
| | 7.0 | 07/13/2000 | 1027 | 1.44 | 0.57 | 0.98 | 0.14 | <0.04 | 0.30 | 0.09 | 1.04 | 1.43 | 0.16 | 0.06 |
| | 7.0 | 08/24/2000 | 1007 | 1.19 | 0.48 | 0.59 | 0.09 | | 0.14 | U | 1.00 | 1.14 | 0.37 | 0.10 |
| | 7.0 | 09/13/2000 | 1007 | 1.34 | 0.45 | 0.54 | 0.12 | | U | U | 0.70 | 0.70 | 0.10 | 0.04 |
| Average | | | | 1.06 | 0.46 | 0.70 | 0.11 | | 0.17 | 0.09 | 1.04 | 1.17 | 0.21 | 0.06 |
| PE - 13 | 0.1 | 07/02/1996 | 1100 | 2.17 | 1.44 | 2.27 | 0.21 | | | | | | | |
| | 0.1 | 07/15/1996 | 1235 | 2.56 | 1.22 | 0.10 | 0.20 | | | | | | | |
| | 0.1 | 08/06/1996 | 1415 | 2.15 | 1.28 | 1.72 | 0.24 | | 0.06 | 0.15 | 2.20 | 2.41 | 0.05 | 0.02 |
| | 0.1 | 09/23/1996 | 1405 | 3.20 | 0.30 | 1.50 | <0.04 | | | | | | | |
| Average | | | | 2.52 | 1.06 | 1.40 | 0.22 | | 0.06 | 0.15 | 2.20 | 2.41 | 0.05 | 0.02 |

| Station | Depth M | Date mm/dd/yy | Time hh/mm | Atrazine ug/L | Alachlor ug/L | Metolachlor ug/L | Cyanazine ug/L | Acetochlor ug/L | Ammonia mg/L | NO3/NO2 mg/L | TKN mg/L | TN mg/L | T - Phos mg/L | T - Ortho-P mg/L |
|---------|------------|------------------|---------------|------------------|------------------|---------------------|-------------------|--------------------|-----------------|-----------------|-------------|------------|------------------|---------------------|
| PE - 13 | 0.1 | 04/22/1997 | 0910 | 0.39 | <0.05 | <0.05 | <0.04 | | 0.10 | 0.70 | 0.70 | 1.50 | 0.05 | 0.02 |
| | 0.1 | 05/21/1997 | 1000 | | | | | | 0.12 | 1.02 | 0.80 | 1.94 | 0.17 | 0.07 |
| | 0.1 | 06/25/1997 | 0915 | 2.97 | 1.15 | 1.42 | <0.04 | | 0.13 | 0.71 | 1.10 | 1.94 | 0.05 | 0.03 |
| | 0.1 | 07/22/1997 | 0900 | 2.93 | 0.57 | 0.85 | 0.18 | | 0.04 | 0.03 | 1.00 | 1.07 | 0.08 | 0.01 |
| | 0.1 | 08/18/1997 | 0855 | 5.70 | 0.10 | 1.02 | <0.04 | | 0.02 | 0.06 | 0.60 | 0.68 | 0.76 | 0.02 |
| | 0.1 | 09/25/1997 | 1100 | 2.64 | 0.50 | 0.75 | 0.28 | | 0.13 | 0.13 | 0.50 | 0.76 | 0.18 | 0.03 |
| Average | | | | 2.93 | 0.58 | 1.01 | 0.23 | | 0.09 | 0.44 | 0.78 | 1.32 | 0.22 | 0.03 |
| PE - 13 | 0.1 | 04/14/1998 | 1420 | 1.15 | 0.15 | 0.28 | 0.10 | | 0.12 | 0.52 | 0.90 | 1.54 | 0.08 | 0.06 |
| | 0.1 | 05/13/1998 | 0840 | 0.76 | 0.26 | 0.18 | 0.07 | | 0.13 | 0.53 | 0.80 | 1.46 | 0.02 | 0.01 |
| | 0.1 | 06/09/1998 | 0900 | 0.95 | 0.28 | 0.22 | 0.08 | | 0.26 | 0.49 | 0.60 | 1.35 | 0.06 | 0.04 |
| | 0.1 | 07/09/1998 | 0850 | 1.66 | 0.60 | 0.58 | 0.14 | | 0.09 | 0.14 | 0.50 | 0.73 | 0.07 | 0.03 |
| | 0.1 | 08/19/1998 | 1410 | 1.23 | 0.33 | 0.55 | 0.12 | | 0.04 | 0.03 | 0.50 | 0.57 | 0.11 | 0.02 |
| | 0.1 | 09/09/1998 | 1320 | 1.43 | 0.30 | 0.55 | 0.10 | | 0.05 | 0.08 | 0.70 | 0.83 | 0.11 | 0.07 |
| Average | | | | 1.20 | 0.32 | 0.39 | 0.10 | | 0.12 | 0.30 | 0.67 | 1.08 | 0.08 | 0.04 |
| PE - 13 | 0.1 | 04/19/1999 | 1015 | 1.28 | 0.14 | 0.56 | 0.08 | | U | 0.79 | 0.44 | | 0.12 | 0.04 |
| | 0.1 | 05/13/1999 | 0900 | 2.56 | 0.28 | 1.38 | 0.15 | | 0.26 | 0.76 | 0.72 | 1.74 | 0.13 | 0.09 |
| | 0.1 | 06/14/1999 | 0930 | 1.08 | 0.95 | 2.37 | 0.07 | | U | 1.50 | 0.55 | 2.05 | 0.12 | 0.07 |
| | 0.1 | 07/14/1999 | 1215 | 1.98 | 1.96 | 2.72 | 0.36 | | 0.08 | 1.06 | 0.36 | 1.50 | 0.11 | 0.05 |
| | 0.1 | 08/17/1999 | 1000 | 0.97 | 1.12 | 2.06 | 0.06 | | U | 0.78 | 0.54 | 1.32 | 0.05 | 0.04 |
| | 0.1 | 09/14/1999 | 0840 | 1.02 | 0.95 | 2.22 | 0.06 | | U | 0.58 | 0.37 | 0.95 | 0.15 | 0.07 |
| Average | | | | 1.48 | 0.90 | 1.89 | 0.13 | | 0.17 | 0.91 | 0.50 | 1.51 | 0.11 | 0.06 |
| PE-13 | 0.1 | 04/18/2000 | 0825 | 0.46 | 0.57 | 1.09 | <0.04 | | U | U | 0.45 | 0.45 | 0.12 | U |
| | 0.1 | 05/17/2000 | 0845 | 0.84 | 0.56 | 1.08 | 0.14 | | 0.02 | U | 0.33 | 0.35 | 0.07 | 0.02 |
| | 0.1 | 06/14/2000 | 1030 | 0.97 | 0.38 | 0.59 | 0.05 | | 0.06 | U | 0.75 | 0.81 | 0.09 | 0.01 |
| | 0.1 | 07/13/2000 | 0845 | 1.18 | 0.51 | 0.75 | 0.10 | <0.04 | 0.48 | U | 0.48 | 0.96 | 0.05 | U |
| | 0.1 | 08/24/2000 | 0940 | 1.15 | 0.45 | 0.63 | 0.10 | | 0.03 | U | 0.62 | 0.65 | 0.05 | 0.02 |
| | 0.1 | 09/13/2000 | 0925 | 1.35 | 0.42 | 0.55 | 0.12 | | U | U | 0.30 | 0.30 | 0.06 | 0.02 |
| Average | | | | 0.99 | 0.48 | 0.78 | 0.10 | | 0.15 | | 0.49 | 0.59 | 0.07 | 0.02 |
| PE - 13 | 16.0 | 07/02/1996 | 1116 | 0.65 | 1.78 | 2.12 | <0.04 | | | | | | | |
| | 5.5 | 07/15/1996 | 1240 | 2.11 | 1.27 | 0.54 | 0.16 | | | | | | | |
| | 9.0 | 08/06/1996 | 1424 | 2.04 | 1.14 | 1.73 | 0.20 | | 0.31 | 0.17 | 0.90 | 1.38 | 0.23 | 0.07 |
| | 8.0 | 09/23/1996 | 1413 | 1.70 | 0.64 | 1.12 | 0.07 | | | | | | | |
| Average | | | | 1.63 | 1.21 | 1.38 | 0.14 | | 0.31 | 0.17 | 0.90 | 1.38 | 0.23 | 0.07 |
| PE - 13 | 6.0 | 04/22/1997 | 0916 | | | | | | | | | | | |
| | 6.0 | 05/21/1997 | 1006 | 2.12 | 0.58 | 1.20 | 0.14 | | | | | | | |
| | 10.0 | 06/25/1997 | 0925 | 2.94 | <0.05 | 1.27 | 0.17 | | | | | | | |
| | 5.0 | 07/22/1997 | 0905 | 2.60 | 0.46 | 1.49 | 0.18 | | 0.07 | 0.34 | 0.40 | 0.81 | 0.02 | 0.01 |
| | 10.0 | 08/18/1997 | 0905 | 2.78 | 0.68 | 1.06 | 0.23 | | 0.02 | 0.09 | 0.70 | 0.81 | 0.21 | 0.04 |
| | 10.0 | 09/25/1997 | 1110 | 2.21 | 0.39 | 0.64 | 0.25 | | 0.47 | 0.25 | 5.90 | 6.62 | 1.59 | 0.10 |
| Average | | | | 2.53 | 0.53 | 1.13 | 0.19 | | 0.19 | 0.23 | 2.33 | 2.75 | 0.61 | 0.05 |

| Station | Depth M | Date mm/dd/yy | Time hh/mm | Atrazine ug/L | Alachlor ug/L | Metolachlor ug/L | Cyanazine ug/L | Acetochlor ug/L | Ammonia mg/L | NO3/NO2 mg/L | TKN mg/L | TN mg/L | T - Phos mg/L | T - Ortho-P mg/L |
|---------|---------|---------------|------------|---------------|---------------|------------------|----------------|-----------------|--------------|--------------|----------|---------|---------------|------------------|
| PE - 13 | 11.0 | 04/14/1998 | 1431 | 1.03 | 0.15 | 0.23 | 0.11 | | 0.17 | 0.55 | 1.20 | 1.92 | 0.04 | 0.04 |
| | 6.0 | 05/13/1998 | 0846 | 0.63 | 0.19 | 0.20 | 0.06 | | 0.17 | 0.69 | 0.90 | 1.76 | 0.12 | 0.02 |
| | 7.0 | 06/09/1998 | 0907 | 0.93 | 0.29 | 0.28 | 0.10 | | 0.28 | 0.53 | 1.10 | 1.91 | 0.06 | 0.04 |
| | 8.0 | 07/09/1998 | 0858 | 1.17 | 0.41 | 0.40 | 0.10 | | 0.30 | 0.28 | 0.90 | 1.48 | 0.44 | 0.03 |
| | 6.0 | 08/19/1998 | 1416 | 1.26 | 0.39 | 0.63 | 0.12 | | 0.08 | 0.12 | 0.40 | 0.60 | 0.14 | 0.03 |
| | 6.0 | 09/09/1998 | 1326 | 1.55 | 0.35 | <0.05 | 0.12 | | 0.07 | 0.10 | 0.40 | 0.57 | 0.12 | 0.05 |
| Average | | | | 1.10 | 0.30 | 0.35 | 0.10 | | 0.18 | 0.38 | 0.82 | 1.37 | 0.15 | 0.04 |
| PE - 13 | 5.0 | 04/19/1999 | 1020 | 1.13 | 0.13 | 0.55 | 0.08 | | U | 0.80 | 0.73 | 1.53 | 0.13 | 0.03 |
| | 18.0 | 05/13/1999 | 0918 | 3.36 | 0.37 | 1.88 | 0.18 | | 0.41 | 1.10 | 0.91 | 2.42 | 0.24 | 0.05 |
| | 11.0 | 06/14/1999 | 0941 | 0.69 | 0.78 | 2.29 | <0.04 | | 0.12 | 1.20 | 1.56 | 2.88 | 0.44 | 0.05 |
| | 3.0 | 07/14/1999 | 1218 | 1.18 | 1.72 | 2.68 | 0.28 | | 0.08 | 1.10 | 0.60 | 1.78 | 0.11 | 0.04 |
| | 11 | 08/17/1999 | 1011 | 0.94 | 1.14 | 2.10 | 0.06 | | 0.04 | 0.92 | 1.06 | 2.02 | 0.17 | 0.05 |
| | 11.0 | 09/14/1999 | 0851 | 0.99 | 1.03 | 2.14 | 0.08 | | 0.02 | 0.49 | 2.14 | 2.65 | 0.55 | 0.12 |
| Average | | | | 1.38 | 0.86 | 1.94 | 0.14 | | 0.13 | 0.94 | 1.17 | 2.21 | 0.27 | 0.06 |
| PE-13 | 6.0 | 04/18/2000 | 0831 | 0.54 | 0.55 | 1.27 | <0.04 | | 0.04 | U | 1.00 | 1.04 | 0.12 | 0.02 |
| | 3.0 | 05/17/2000 | 0848 | 1.16 | 0.58 | 1.25 | 0.14 | | 0.03 | U | 0.88 | 0.91 | 0.10 | 0.02 |
| | 6.0 | 06/14/2000 | 1036 | 1.07 | 0.28 | 0.82 | 0.09 | | 0.03 | U | 0.56 | 0.59 | 0.08 | 0.02 |
| | 10.0 | 07/13/2000 | 0855 | 1.28 | 0.59 | 0.87 | 0.10 | <0.04 | 1.02 | U | 1.40 | 2.42 | 0.24 | 0.04 |
| | 8.0 | 08/24/2000 | 0948 | 1.24 | 0.47 | 0.63 | 0.08 | | 0.18 | U | 0.86 | 1.04 | 0.09 | 0.03 |
| | 8.0 | 09/13/2000 | 0933 | 1.18 | 0.44 | 0.53 | 0.12 | | U | U | 0.70 | 0.70 | 0.08 | U |
| Average | | | | 1.08 | 0.49 | 0.90 | 0.11 | | 0.26 | | 0.90 | 1.12 | 0.12 | 0.03 |